Vol. 1107 Number 5

OFFICIAL GAZETTE

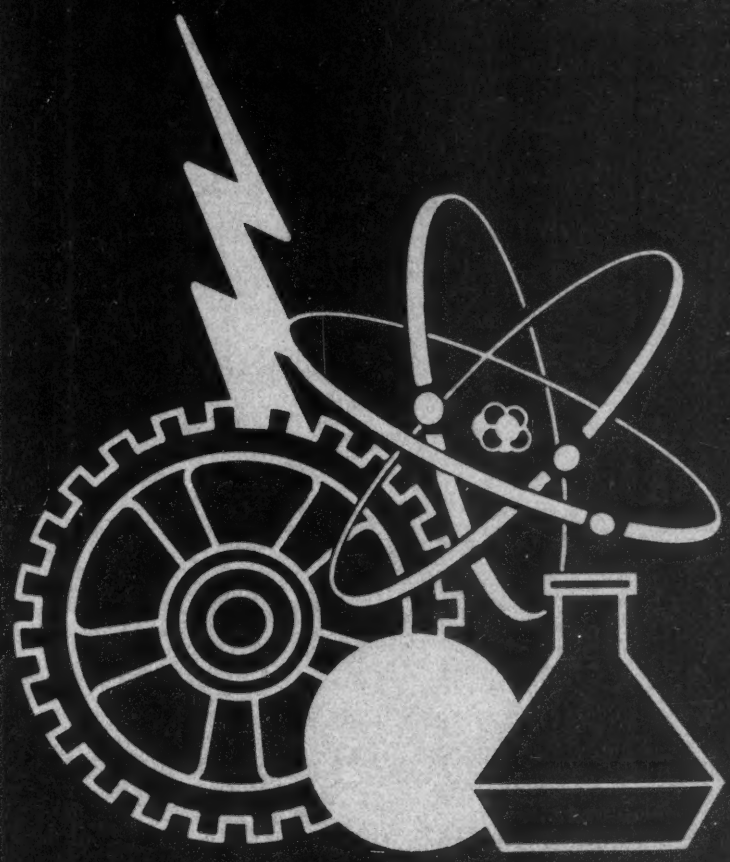
of the

UNITED STATES PATENT AND TRADEMARK OFFICE

Route to:

PATENTS

October 31, 1989



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OFFICIAL GAZETTE of the
UNITED STATES PATENT AND TRADEMARK OFFICE

October 31, 1989 Volume 1107 Number 5

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The following are mailed under direction of the Superintendent of Documents, Government Printing Office, Washington, D.C., 20402, to whom all subscriptions should be made payable and all communications addressed.

THE OFFICIAL GAZETTE (PATENT SECTION), issued weekly.
THE OFFICIAL GAZETTE (TRADEMARK SECTION), issued weekly.
GENERAL INFORMATION concerning PATENTS.
GENERAL INFORMATION concerning TRADEMARKS.

COPIES OF PATENTS are furnished by the Patent and Trademark Office at $1.50 each; PLANT PATENTS in color, $10.00 each; copies of TRADEMARKS at $1.50 each. Address orders to the Commissioner of Patents and Trademarks, Washington, D.C., 20231.

Printing authorized by Section 11(a)3 of Title 35, U.S. P.T.O.

PATENT AND TRADEMARK OFFICE NOTICES

Patent Cooperation Treaty (PCT) Information

For information concerning the PCT member countries see the notice appearing in the *Official Gazette* at 1107 O.G. 5 on Oct. 3, 1989.

For use of the European Patent Office as an International Searching Authority for international applications filed in the United States Receiving Office, see the notice appearing in the *Official Gazette* at 1022 O.G. 52 on Sept. 28, 1982.

For use of the European Patent Office as an International Preliminary Examining Authority for international applications filed in the United States Receiving Office, see the notices appearing in the *Official Gazette* at 1080 O.G. 2 on July 7, 1987 and at 1091 O.G. 2 on June 7, 1988.

The Search fee of the European Patent Office was changed due to a difference in the exchange rate of the U.S. dollar with regard to the German Mark as of Sept. 1, 1989, and was announced in the *Official Gazette* at 1105 O.G. 36 on Aug. 15, 1989.

International PCT fees were changed on June 1, 1989 due to a difference in the exchange rate of the U.S. dollar with regard to the Swiss Franc and were announced in the *Official Gazette* at 1102 O.G. 90 on May 30, 1989.

Certain domestic PCT fees and charges for International Search and Preliminary Examination have been changed effective Apr. 17, 1989 and were announced in the *Official Gazette* at 1100 O.G. 24 on Mar. 7, 1989.

The current schedule of PCT fees (in U.S. dollars) is as follows:

Transmittal fee:	170.00
Search Fee	
U.S. Patent and Trademark Office (USPTO) as International Searching Authority (ISA)	
—No corresponding prior U.S. national application filed	550.00
—Corresponding prior U.S. national application filed	380.00
—Supplemental search fee, per additional invention	150.00
European Patent Office as ISA	1040.00
Preliminary examination fee	
USPTO as International Preliminary Examining Authority (IPEA)	
—Search fee paid to USPTO as ISA	400.00
—Additional examination fee, per additional invention	130.00
—ISA not the USPTO	600.00
—Additional examination fee, per additional invention	200.00
International fees	
Basic fee	436.00
Basic Supplemental fee (for each page over 30)	9.00
Designation fee per country or region for the first 10 national or regional offices	106.00
Designation fee for 11th and subsequent designations:	No Charge
Handling fee	134.00

U.S. National Stage fees

	Small Entity	Regular
USPTO was IPEA	165.00	330.00
USPTO was ISA but not IPEA	185.00	370.00
USPTO was neither ISA nor IPEA	250.00	500.00
USPTO was IPEA and all claims presented satisfied provisions of PCT Article 33(2) to (4)	25.00	50.00
—For each independent claim in excess of 3	18.00	36.00
—For each claim in excess of 20	6.00	12.00
—For each application containing a multiple dependent claim	60.00	120.00
—Surcharge for filing national fee or oath or declaration after the time limit applicable under PCT Article 22 or 39.1	60.00	120.00
—Processing fee for filing English translation after the time limit applicable under PCT Article 22 or 39.1	30.00	30.00

Sept. 12, 1989. DONALD J. QUIGG,
Assistant Secretary and Commissioner of Patents and Trademarks.

Status of Appeal Cases

The Date of Examiner's Answer of Oldest Ex Parte Appeals Awaiting Assignment to Panel For A Decision Without a Hearing as of September 30 , 1989.

Chemical Discipline -	April 3, 1989
Mechanical Discipline -	June 6 1988
Electrical Discipline -	April 25, 1988

The Date of Examiner's Answer of Oldest Ex Parte Appeals Awaiting Hearing as of September 30, 1989.

Chemical -	October 1, 1987
Electrical -	December 1, 1987
Mechanical -	August 4, 1987

Board of Patent Appeals and Interferences Decisions Rendered in Ex Parte Appeals During the Month of September 1989.

Affirmed	291
Affirmed-in-Part	58
Reversed	177
Total Decided	526

Notice of Maintenance Fees Payable

Title 37, Code of Federal Regulations, Section 1.362(d), effective Nov. 1, 1984, provides that maintenance fees may be paid without surcharge for a six-month period beginning 3, 7, and 11 years after the date of issue of patents based on application filed on or after Dec. 12, 1980. An additional six-month grace period is provided by 35 U.S.C. 41(b) and 37 CFR 1.362(e) for payment of the maintenance fee with the surcharge set forth in 37 CFR 1.20(k) or (l), as amended effective Apr. 17, 1989. If the maintenance fee is not paid in a patent requiring such payment the patent will expire on the 4th, 8th or 12th anniversary of the patent.

Attention is drawn to the patents which were issued on October 28, 1986, for which maintenance fees due at 3 years and six months may now be paid. The patents have patent numbers within the following ranges:

Utility Patents 4,619,003 through 4,620,321
Reissue Patents based on the above identified patents.

Attention is drawn to the patents which were issued on October 26, 1982 for which maintenance fees due at 7 years and six months may now be paid. The patents have patent numbers within the following ranges:

Utility Patents 4,355,424 through 4,356,568
Reissue Patents based on the above identified patents.

No maintenance fees are required for design or plant patents.

Payments of maintenance fees in patents should be directed to "Commissioner of Patents and Trademarks, Box M. Fee, Washington, D.C. 20231."

The current amounts of the maintenance fees due at 3 years and six months and seven years and six months are set forth in 37 CFR 1.20(e), (f), (h) and (i), as amended effective Apr. 17, 1989, which are reproduced below:

37 CFR § 1.20 Post-issuance fees

" (e) For maintaining an original or reissue patent, except a design or plant patent, based on an application filed on or after after Dec. 12, 1980 and before Aug. 27, 1982, in force beyond 4 years; the fee is due by three years and six months after the original grant.....$245.00"

"(f) For maintaining an original or reissue patent, except a design or plant patent, based on an application filed on or after Dec. 12, 1980 and before Aug. 27, 1982, in force beyond 8 years; the fee is due by seven years and six months after the original grant..... $495.00"

"(h) For maintaining an original or reissue patent except a design or plant patent, based on an application filed on or after Aug. 27,1982, in force beyond 4 years; the fee is due by three years and six months after the original grant:

By a small entity (§1.9(f))....$245.00
By other than a small entity....$490.00"

"(i) For maintaining an original or reissue patent, except a design or plant patent, based on an application filed on or after Aug. 27, 1982, in force beyond 8 years; the fee is due by seven years and six months after the original grant:

By a small entity (§1.9(f))....$495.00
By other than a small enttity....$990.00"

The amounts of the surcharges as amended effective Apr. 17, 1989, are set forth in 37 CFR 1.20 (k), (l) and (m) which are reproduced below:

"(k) Surcharge for paying a maintenance fee during the 6-month grace period following the expiration of three years and six months , seven years and six months, and eleven years and six months after the date of the original grant of a patent based on an application filed on or after Dec. 12, 1980 and before Aug. 27, 1982.....$120.00"

"(l) Surcharge for paying a maintenance fee during the 6-month grace period following the expiration of three years and six months, seven years and six months, and eleven years and six months after the date of the original grant of a patent based on an application filed on or after Aug. 27, 1982:

By a small entity(§1.9(f))....$60.00
By other than a small entity....$120.00"

"(m) Surcharge for accepting a maintenance fee after expiration of a patent for non-timely payment of a maintenance fee where the delay is shown to the satisfaction of the Commissioner to have been unavoidable.....$550.00"

Notice of Expiration of Patents Due to Failure to Pay Maintenance Fees

35 U.S.C. 41 and 37 CFR 1.362(g) provide that if the required maintenance fee and any applicable surcharge are not paid in a patent requiring such payment, the patent will expire at the end of the 4th, 8th, or 12th anniversary of the grant of the patent depending on the first maintenance fee which was not paid.

According to the records of the Office, the patents listed below have expired due to failure to pay the required maintenance fee and any applicable surcharge.

PATENTS WHICH EXPIRED AUGUST 13, 1989
DUE TO FAILURE TO PAY MAINTENANCE FEES

Patent Number	Serial Number	Issue Date
4,534,065	06/575,272	08/13/85
4,534,066	06/657,358	08/13/85
4,534,072	06/616,688	08/13/85
4,534,073	06/516,206	08/13/85
4,534,074	06/581,843	08/13/85
4,534,085	06/486,998	08/13/85
4,534,090	06/500,374	08/13/85
4,534,093	06/415,658	08/13/85
4,534,096	06/661,634	08/13/85
4,534,108	06/528,914	08/13/85
4,534,110	06/453,838	08/13/85
4,534,118	06/412,932	08/13/85
4,534,125	06/629,055	08/13/85
4,534,140	06/472,814	08/13/85
4,534,144	06/441,076	08/13/85
4,534,147	06/448,246	08/13/85
4,534,150	06/456,374	08/13/85
4,534,151	06/514,802	08/13/85
4,534,156	06/577,009	08/13/85
4,534,159	06/441,088	08/13/85
4,534,169	06/385,190	08/13/85
4,534,170	06/560,684	08/13/85
4,534,172	06/544,955	08/13/85
4,534,185	06/503,282	08/13/85
4,534,189	06/568,571	08/13/85
4,534,195	06/464,940	08/13/85
4,534,199	06/532,070	08/13/85
4,534,209	06/532,363	08/13/85
4,534,224	06/611,333	08/13/85
4,534,227	06/553,353	08/13/85
4,534,228	06,462,608	08/13/85
4,534,231	06/506,372	08/13/85
4,534,235	06/547,809	08/13/85
4,534,237	06/539,329	08/13/85
4,534,265	06/537,212	08/13/85
4,534,271	06/508,793	08/13/85
4,534,276	06/665,313	08/13/85
4,534,280	06/545,229	08/13/85
4,534,282	06/374,906	08/13/85
4,534,293	06/667,315	08/13/85
4,534,296	06/490,025	08/13/85
4,534,303	06/537,482	08/13/85
4,534,307	06/540,042	08/13/85
4,534,308	06/438,276	08/13/85
4,534,310	06/512,680	08/13/85
4,534,311	06/561,927	08/13/85
4,534,317	06/645,788	08/13/85
4,534,319	06/589,214	08/13/85
4,534,339	06/542,611	08/13/85
4,534,342	06/594,208	08/13/85
4,534,369	06/641,212	08/13/85
4,534,370	06/537,447	08/13/85
4,534,373	06/428,562	08/13/85
4,534,377	06/543,162	08/13/85
4,534,391	06/560,733	08/13/85
4,534,393	06/617,963	08/13/85
4,534,399	06/625,278	08/13/85
4,534,402	06/478,273	08/13/85

Patent Number	Serial Number	Issue Date
4,534,407	06/527,810	08/13/85
4,534,418	06/447,259	08/13/85
4,534,430	06/562,514	08/13/85
4,534,431	06/594,132	08/13/85
4,534,432	06/332,209	08/13/85
4,534,445	06/609,617	08/13/85
4,534,446	06/563,667	08/13/85
4,534,448	06/463,294	08/13/85
4,534,460	06/457,970	08/13/85
4,534,464	06/448,030	08/13/85
4,534,467	06/668,172	08/13/85
4,534,471	06/488,678	08/13/85
4,534,472	06/533,663	08/13/85
4,534,474	06/430,279	08/13/85
4,534,476	06/510,703	08/13/85
4,534,481	06/636,910	08/13/85
4,534,488	06/673,592	08/13/85
4,534,501	06/357,240	08/13/85
4,534,505	06/569,450	08/13/85
4,534,517	06/540,492	08/13/85
4,534,520	06/563,218	08/13/85
4,534,524	06/539,119	08/13/85
4,534,525	06/493,386	08/13/85
4,534,527	06/575,407	08/13/85
4,534,528	06/574,529	08/13/85
4,534,529	06/503,668	08/13/85
4,534,531	06/283,157	08/13/85
4,534,537	06/504,258	08/13/85
4,534,548	06/549,734	08/13/85
4,534,553	06/415,357	08/13/85
4,534,562	06/502,050	08/13/85
4,534,565	06/625,675	08/13/85
4,534,566	06/638,531	08/13/85
4,534,567	06/463,636	08/13/85
4,534,570	06/594,986	08/13/85
4,534,576	06/471,133	08/13/85
4,534,581	06/561,474	08/13/85
4,534,583	06/441,190	08/13/85
4,534,584	06/464,258	08/13/85
4,534,588	06/603,682	08/13/85
4,534,591	06/433,905	08/13/85
4,534,593	06/492,191	08/13/85
4,534,594	06/677,321	08/13/85
4,534,605	06/497,206	08/13/85
4,534,607	06/616,873	08/13/85
4,534,609	06/524,987	08/13/85
4,534,627	06/402,049	08/13/85
4,534,654	06/517,587	08/13/85
4,534,663	06/539,665	08/13/85
4,534,670	06/552,111	08/13/85
4,534,672	06/582,822	08/13/85
4,534,675	06/535,792	08/13/85
4,534,686	06/455,987	08/13/85
4,534,699	06/506,785	08/13/85
4,534,703	06/527,686	08/13/85
4,534,705	06/460,025	08/13/85
4,534,708	06/638,496	08/13/85
4,534,716	06/536,917	08/13/85
4,534,725	06/364,305	08/13/85
4,534,736	06/602,713	08/13/85
4,534,737	06/495,528	08/13/85
4,534,743	06/528,310	08/13/85
4,534,747	06/522,598	08/13/85
4,534,753	06/559,672	08/13/85
4,534,759	06/488,543	08/13/85
4,534,762	06/453,606	08/13/85
4,534,778	06/542,058	08/13/85
4,534,786	06/600,260	08/13/85
4,534,796	06/307,448	08/13/85
4,534,800	06/554,681	08/13/85
4,534,802	06/573,259	08/13/85
4,534,835	06/454,674	08/13/85
4,534,844	06/678,480	08/13/85
4,534,851	06/500,408	08/13/85
4,534,858	06/616,905	08/13/85
4,534,862	06/521,775	08/13/85
4,534,863	06/612,905	08/13/85
4,534,890	06/570,202	08/13/85
4,534,891	06/574,155	08/13/85
4,534,897	06/598,608	08/13/85
4,534,901	06/523,968	08/13/85
4,534,913	06/572,805	08/13/85
4,534,937	06/479,900	08/13/85
4,534,946	06/558,777	08/13/85
4,534,955	06/510,379	08/13/85
4,534,984	06/523,807	08/13/85
4,534,993	06/569,869	08/13/85
4,534,994	06/608,023	08/13/85
4,535,014	06/307,439	08/13/85
4,535,019	06/270,265	08/13/85
4,535,024	06/438,220	08/13/85
4,535,026	06/509,118	08/13/85
4,535,031	06/586,108	08/13/85
4,535,032	06/539,034	08/13/85
4,535,059	06/457,807	08/13/85
4,535,065	06/421,111	08/13/85
4,535,074	06/593,323	08/13/85
4,535,076	06/503,371	08/13/85
4,535,079	06/543,013	08/13/85
4,535,087	06/443,010	08/13/85
4,535,089	06/494,023	08/13/85
4,535,091	06/589,290	08/13/85
4,535,092	06/438,351	08/13/85
4,535,147	06/629,281	08/13/85
4,535,164	06/478,272	08/13/85
4,535,172	06/338,008	08/13/85
4,535,179	06/471,760	08/13/85
4,535,192	06/671,330	08/13/85
4,535,202	06/509,789	08/13/85
4,535,213	06/435,509	08/13/85
4,535,217	06/516,144	08/13/85
4,535,223	06/544,830	08/13/85
4,535,224	06/544,829	08/13/85
4,535,230	06/367,056	08/13/85
4,535,240	06/535,384	08/13/85
4,535,254	06/492,025	08/13/85
4,535,278	08/481,324	08/13/85
4,535,280	06/594,300	08/13/85
4,535,288	06/399,320	08/13/85
4,535,293	06/526,727	08/13/85
4,535,297	06/569,429	08/13/85
4,535,298	06,549,479	08/13/85
4,535,312	06/530,182	08/13/85
4,535,321	06/612,551	08/13/85
4,535,325	06/510,586	08/13/85
4,535,331	06/533,120	08/13/85
4,535,336	06/545,402	08/13/85
4,535,339	06/525,390	08/13/85
4,535,346	06/493,317	08/13/85
4,535,355	06/415,317	08/13/85
4,535,370	06/452,335	08/13/85
4,535,386	06/497,099	08/13/85
4,535,390	06/623,834	08/13/85
4,535,391	06/632,886	08/13/85
4,535,394	06/559,298	08/13/85
4,535,395	06/521,026	08/13/85
4,535,400	06/529,307	08/13/85
4,535,403	06/618,776	08/13/85
4,535,418	06/445,378	08/13/85
4,535,435	06/393,292	08/13/85
4,535,436	06/504,223	08/13/85
4,535,443	06/504,101	08/13/85
4,535,444	06/341,671	08/13/85
4,535,446	06/524,776	08/13/85

Patent Number	Serial Number	Issue Date	4,535,471	06/526,843	08/13/85
			4,535,474	06/522,993	08/13/85
4,535,457	06/593,759	08/13/85	4,535,475	06/427,000	08/13/85

NOTIFICATION OF ACCEPTANCE OF DELAYED PAYMENT OF MAINTENANCE FEE (35 U.S.C. 41(c); 37 CFR 1.378)

The patent(s) listed below is considered as not having expired but is subject to the conditions set forth in 35 U.S.C. 41(c)(2), in view of the Petition to Accept Late Payment of the maintenance fees which has been GRANTED BY THE COMMISSIONER OF PATENTS AND TRADEMARKS, as provided for under 35 U.S. C. 41(c)(1) and 37 CFR 1.378.

Patent No	Serial No.	Patent Date	Application Filing Date	Delayed Payment Acceptance Date
4,456,413	06/434,294	06/26/84	10/14/82	09/26/89

REISSUE APPLICATIONS FILED

Notice under 37 CFR 1.11(b). The reissue applications listed below are open to inspection by the general public in the indicated Examining Groups and copies may be obtained by paying the fee therefor (37 CFR 1,21(b)).

4,606,166, Re. S. N. 233,633, Filed Aug. 18, 1988, Cl. 52/644, FIRE-RATED BEAM WITH EXPANSION RELIEF SECTION, Eugene E. Brady, et al., Owner of Record: *National Rolling Mills Inc., Malvern, Pa.,* Attorney or Agent: Eugene Chovanes, Ex. Gp.: 354

4,665,851, Re. S. N. 411,826, Filed Sept. 25, 1989, Cl. 112/262.100, METHOD OF ASSEMBLING TEXTILES, Paul J. Sweet , Owner of Record: *Inventor,* Attorney of Agent: Donald S. Dowden, Ex. Gp.: 247

4,679,637, Re. S. N. 384,775, Filed July 14, 1989, Cl. 175/61, APPARATUS AND METHOD FOR FORMING AN ENLARGED UNDERGROUND ARCUATE BORE AND INSTALLING A CONDUIT THEREIN, Martin D. Cherrington, Owner of Record: *Inventor(s),* Attorney or Agent: William L. Lafuze, Ex. Gp.: 356

4,694,924, Re. S. N. 411,305, Filed Sept. 22, 1989, Cl. 180/068.3, MOTOR CYCLE, Toshimitsu Asakura, et al., Owner of Record: *Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan,* Attorney or Agent: Gerald H. Kiel, Ex. Gp.: 316

4,695,176, Re. S. N. 410,734, Filed Sept. 21, 1989, Cl. 410/144, FOUNTAIN APPLICATION HANDLE WITH REFILL VALVE, Dallas W. Simonette, et al., Owner of Record: *Power-Flo Products Corporation, Minneapolis, Minn.,* Attorney or Agent: John L. Knoble, Ex. Gp.: 332

4,695,953, Re. S. N. 410,651, Filed Sept 21, 1989, Cl. 364/410, T.V. ANIMATION INTERACTIVELY CONTROLLED BY THE VIEWER, Preston E. Blair et al., Owner of Record: *Inventor(s),* Attorney or Agent: Leslie G. Murray, Ex. Gp.: 236

4,700,979, Re. S. N. 408,865, Filed Aug. 28, 1989, Cl. 294/89, APPARATUS FOR LIFTING CONCRETE PANELS, Peter D. Courtois, et al., Owner of Record: *Dayton Superior Corp., Miamisburg, Ohio,* Attorney or Agent: Thomas W. Flynn, Ex. Gp.: 312

4,708,338, Re. S. N. 411,803, Filed Sept. 25, 1989, Cl. 272/70, STAIR CLIMBING EXERCISE APPARATUS, Lanny L. Potts, Owner of Record: *Tri-Tech Inc., Tulsa, Okla.,* Attorney or Agent: Richard L. Hughes, Ex. Gp.: 332

4,758,723, Re. S. N. 409,440, Filed Sept. 18, 1989, Cl. 250/305, ELECTRON SPECTROMETER, Ian R. M. Wardell et al., Owner of Record: *VG Instruments Group Ltd.,* Attorney or Agent: Authur Schwartz, Ex. Gp.: 256

4,785,102, Re. S. N. 411,962, Filed Sept. 25, 1989, Cl. 546/20, PHOTOLYTICALLY CLEAVABLE, N-ACYLATED STERICALLY HINDERED AMINES, Godwin Berner, et al., Owner of Record: *Ciba-Geiby Corp., Ardsley, N.Y.,* Attorney or Agent: Joann Villamizar Ex. Gp.: 129

REQUESTS FOR REEXAMINATION FILED

Notice under 37 CFR 1.11(c). The requests for reexamination listed below are open to inspection by the general public in the indicated Exoamining Groups. Copies of the requests and related papers may be obtained by paying the fee therefor established in the Rules (37 CFR 1.19(a)).

In the event correspondence to the patent owner is not received, this notice will be considered to be constructive notice to the patent owner and reexamination will proceed (37 CFR 1.248(a)(5) and 1.525(b).

3,425,430, Reexam No. 90/001,804, Requested June 30, 1989, Cl. 318/576, FLUID-OPERATED SYSTEM, Billy M. Horton, Owner of Record: *Ronald E. Bowles, Raymond W. Warren, Billy M. Horton, Shaker Heights, Ohio,* Attorney or Agent: Unknown, Ex. Gp.: 210, Requester: Jim Zegeer, Alexandria, Va.

3,826,728, Reexam. No. 90/001,848, Requested Sept. 25, 1989, Cl. 204/192, TRANSPARENT ARTICLES HAVING REDUCED SOLAR RADIATION TRANSMITTANCE AND METHOD OF MAKING THE SAME, Douglas L. Chambers, et al., Owner of Record: *The BOC Group, PLC., Windlesham Surrey, England,* Attorney or Agent: David Draegert, Ex. Gp.: 110, Requester: Shatterproof Glass Corp., Detroit, Mich.

4,314,665, Reexam. No. 90/001,849, Requested Sept. 27, 1989, Cl. 236/46, ELECTRONIC THEROSTAT, Michael Levine, Owner of Record: *Honeywell Inc., Minneapolis, Minn.,* Attorney or Agent: Unknown, Ex. Gp.: 340, Requester: Owner

4,473,362, Reexam. No. 90/001,853, Requested: Sept. 29, 1989, Cl. 474/135, BELT TENSIONER WITH VARIABLY PROPORTIONAL DAMPING, Henry W. Thomey, et al., Owner of Record: *Litens Automotive Inc., Ontario, Canada,* Attorney or Agent: Cushman, Darby & Cushman, Ex. Gp.: 350, Requester: The Gates Rubber Co., Denver, Colo.

4,484,104, Reexam. No. 90/001,852, Requested Sept. 29, 1989, Cl. 315/86, SOLAR-POWERED LIGHTING SYSTEM, Peter O'Brien, Owner of Record: *Solarmark ITL, Crownest, New South Wales, Australia,* Attorney or Agent: Kimmel, Crowell & Weaver, Ex. Gp.: 260, Requester: William A. Blake, Arlington, Va.

4,491,005, Reexam 90/001,851, Requested Sept. 27, 1989, Cl. 72/201, ROLLING MILL, Tomoaki Kimura, et al., Owner of Record: *Hitachi Ltd., Tokyo, Japan,* Attorney or Agent: Thomas E. Beall, Ex. Gp.: 320, Requester: SMS Shloemann-Siemag AG, Dusseldorf, Germany

4,841,988, Reexam. No. 90/001,850, Requested Sept. 27, 1989, Cl. 128/804, MICROWAVE HYPERTHERMIA, Richard

W. Fetter, et al., Owner of Record: *Marquette Electronics, Inc., Milwaukee, Wis.*, Attorney or Agent: Andrus, Sceales, Starke & Sawall, Ex. Gp.: 330, Requester: Owner

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Service by Publication

A petition to cancel the registration identified below having been filed, and the notice of such proceeding sent by certified mail to registrant at the last known address having been returned by the Postal Service as undeliverable, notice is hereby given that unless the registrant listed herein, its assigns or legal representatives shall enter an appearance within thirty days from the date of this publication, the cancellation will be proceeded with as in the case of default.

San Francisco Shirt Works, Inc., San Francisco, Calif., Reg. No. 1,013,581, for the mark "PRIVATE RESERVE" and design, Canc. No. 17,925

ERMA S. BROWN
Administrator of the Trademark Trial and Appeal Board
For JEFFREY M. SAMUELS
Assistant Commissioner for Trademarks

MAINTENANCE FEE PAYMENTS

The Patent and Trademark Office (PTO) has received inquiries concerning the PTO'S refusal to accept payment of a maintenance fee in two fact situations.

A. The PTO has refused to accept authorization to charge a maintenance fee and/or surcharge to a Deposit Account unless the paper containing the authorization to charge was timely filed and included an authorizing signature. Upon reconsideration, this requirement for a signature to authorize a maintenance fee and/or surcharge to be charged to a Deposit Account is abolished since papers concernng maintenance fees are not considered to be papers filed in the application under 37 CFR 1.33(a).

Request for refunds due to the above-noted change in practice should be directed to the Refund Section of the Accounting Division of the Office of Finance.

B. The PTO has refused to accept the maintenance fee and surcharge specified in a Maintenance Fee Reminder mailed prior to April 17, 1989, but paid on or after April, 17, 1989. New fees effective April 17, 1989, raised the amount due for maintenance fees and surcharges. However, Maintenance Fee Reminders mailed prior to that date reflected the old fees. Some patentees have submitted the amount requested on the Maintenance Fee Reminder only to have the PTO refuse to accept those fees due as being insufficient. Often, the PTO notice that the amount tendered is insufficient is received after the expiration date of the patent under 37 CFR 1.362(g).

The amount of the maintenance fee required by statute is based upon the date of effective receipt in the PTO. The amount of the surcharge needed for payment during the six month grace period is set by regulation. The PTO will accept the payment submitted under the following conditions:

(1) the total amount submitted for the maintenance fee and surcharge was at least the amount of the maintenance fee required by statute based upon the date of receipt in the PTO and was the total amount requested in the Maintenance Fee Reminder for the patent;

(2) the amount submitted was paid prior to expiration of the patent under 37 CFR 1.362(g);

(3) the insufficiency in payment of the maintenance fee and surcharge is discovered after expiration of the patent under 37 CFR 1.362(g); and

(4) a petition under 37 CFR 1.183 is promptly filed after discovery of the insufficiency in payment of the maintenance fee and surcharge. The petition must request (a) that the amount previously paid be accepted as the maintenance fee required by statute; (b) that the amount submitted above that required for the maintenance fee be accepted as the surcharge; (c) that the holding of expiration be withdrawn; and (d) that no petition fee be required. The petition must state the date the insufficiency in payment of the maintenance fee and surcharge was discovered. The petition must also include a statement that the person who authorized or instructed that the maintenance fee and surcharge be paid was not aware of the fee increase. Such statement must be verified if made by a person not registered to practice before the PTO.

Petition under 37 CFR 1.183 should be directed to the Office of the Deputy Assistant Commissioner for Patents.

October 4, 1989

DONALD J. QUIGG
Assistant Secretary and Commissioner of Patents and Trademarks

Status of PTO Services

The following is an update of the status of PTO services for August 1989:

Service Item	FY 1989 Goal (Calendar Days [1])	Monthly Average (Calendar Days [1])
Filing Receipts:		
Patents	22	16
Trademarks	30	18
Patent/Trademark Copies:		
Special Window Coupons	24 Hours	14 Hours
Window Coupons	5	2
Mail Coupons	12	6
Letter Orders	16	8
Certified Copies:		
Trademark Registrations	21	35
Applications-As-Filed	17	13*
File-Wrapper/Contents	N/A	16
Walk-up Certification	1	1
Trademark Search Library:		
Filing Pending Marks	21	28**
Filing Reg. Certificates	Issue Date+2 Days	+1 Day
Filing Temp. Drawings	6	7
Assignments:		
Recording Patent-New Applications	43	121***
Recording Patents-Mail Room Recpts.	20	122***
Receipt Date of Bulk Pat. Docs. Returned by End of Month		Mar. 27-Apr. 9, 1989***
Recording Trademarks	20	84***
Receipt Date of Bulk Trademark Documents Returned by End of Month		June 19-July 2, 1989***
Avg. Days from Issue Fee Payment to Issue Date	90-100	74
Issue Fee Receipts Mailed	4 weeks prior to Issue Date	+27 Days****
Patent Copies Available	95% on Issue Date	+67 Days****
Trademark Copies Available	95% on Issue Date	99% on Issue Date

[1] Unless otherwise noted.
* The 5% of orders for which fiche are not on site are not included in calculations.
** Staffing vacancies exist in TMSL. Overtime is being used to reduce the backlog.
*** Working on backlog.
**** Contractor difficulties in keeping up with the increase in the quantities of patents being issued.

IMPROVEMENT TO SERVICES

•*Mail Processing Improvements —Preaddressed Incoming Mail*—In July 1989, a pilot program was established to determine the feasibility of providing preaddressed return envelopes and/or preaddressed labels with Office actions in order to provide faster and more accurate handling of responses. Four offices - a Trademark Law Office, a Patent Examining Group, the Patent Application Division, and the Assignment Division are involved in the pilot program. From July through September, each of these offices mailed out an envelope and a label with each office action for which a response is expected. A total of four thousand envelopes and labels have been mailed out. The envelopes and labels are a distinctive yellow color so that the PTO can readily sort them from other mail. Records of receipts will be analyzed to determine the responsiveness in using the envelopes or labels provided and the predominant preference of the two alternatives. The pilot will terminate in December. Thus far, the respsonse has been almost unanimously in favor of the program.

•*Trademark Minority Exhibit*— An exhibit focusing on black entrepreneurship in the 20th century was unveiled recently at the PTO. It features eight registered trademark holders whose accomplishments reflect the growth and diversity of Black-owned businesses in this century. The exhibit was developed collaboratively by the Assistant Commissioners for Trademarks and Administration. After an inaugural showing at the PTO, the exhibit was on display at a Blacks in Government meeting and will be available for other meetings and special events.

•*Voice Information System —Special Boxes*— Effective Oct. 1, 1989, The PTO began a four-month test of a prerecorded Voice Information System. The system will contain messages on special box designations within the PTO which enable the Mail Room to identify and sort mail at a faster rate. Use of the special box designations will result in a more efficient operation and provide better service to the public.

In order to reach the prerecorded message, callers should dial (703) 557-MAIL. The system will answer calls 24 hours a day, 7 days a week. If the service is determined to be useful to the public, it will be installed permanently with an additional referral feature that will allow callers who need additional information to be transferred to a Information Specialist in the Public Service Center.

HELPFUL HINTS

•*Appeal Briefs*—Briefs filed in cases where the notice of appeal to the Board of Patent Appeals and Interferences was filed on or after Sept. 12, 1988, must comply with amended 37 CFR 1.192(c) and MPEP Section 1206. 37 CFR 1.192(c) now requires that the brief contain at least the following headings, in the order indicated, and narratives as explained therein and elaborated upon in MPEP Section 1206:

(1) Status of Claims
(2) Status of Amendments
(3) Summary of Invention
(4) Issues
(5) Grouping of Claims
(6) Argument - Each issue presented for reveiw should be treated under the following headings, as appropriate:
  (i) 35 U.S.C. Section 112, first paragraph
  (ii) 35 U.S.C. Section 112, second paragraph
  (iii) 35 U.S.C. Section 102
  (iv) 35 U.S.C. Section 103
  (v) Other Rejections
(7) Appendix - A clean copy of the claims, preferably double spaced, involved in the appeal.

37 CFR 1.192(d) provides that if a brief is filed which does not comply with the requirements of paragraph (c), the appellant will be notified of the reasons for non-compliance and given a one month time limit within which to file an amended brief.

If the applicant does not file an amended brief within the one-month period, or files an amended brief which does not overcome all the reasons for non-compliance stated in the notification, the appeal will be dismissed.

Oct. 6, 1989

THERESA A. BRELSFORD
Assistant Commissioner
for Administration

PATENT NOTICES

Certificates of Correction For Week of October 31 1989

4,515,920	4,778,787	4,802,567	4,813,772
4,556,126	4,779,111	4,802,743	4,813,823
4,693,014	4,779,149	4,803,170	4,814,107
4,708,141	4,780,121	4,805,075	4,814,158
4,710,403	4,783,367	4,805,154	4,814,243
4,717,189	4,783,376	4,806,234	4,814,324
4,719,295	4,783,524	4,806,288	4,814,404
4,719,373	4,785,355	4,806,645	4,814,620
4,726,876	4,785,427	4,806,920	4,815,169
4,728,825	4,785,440	4,807,172	4,815,685
4,735,259	4,786,107	4,807,193	4,816,834
4,736,230	4,786,377	4,807,405	4,817,229
4,737,857	4,786,501	4,807,596	4,817,359
4,739,164	4,787,148	4,808,045	4,817,403
4,743,917	4,788,485	4,808,138	4,817,655
4,746,406	4,789,415	4,808,255	4,817,747
4,748,474	4,789,672	4,808,302	4,818,126
4,749,848	4,789,999	4,809,103	4,818,171
4,749,931	4,790,165	4,810,003	4,818,185
4,750,888	4,792,669	4,810,118	4,818,380
4,751,344	4,794,164	4,810,122	4,818,630
4,751,553	4,794,342	4,810,358	4,818,848
4,752,254	4,795,466	4,810,361	4,818,874
4,753,649	4,795,962	4,810,518	4,818,947
4,755,450	4,796,118	4,811,050	4,819,459
4,757,213	4,797,319	4,811,273	4,819,770
4,760,353	4,798,511	4,811,564	4,819,779
4,762,521	4,798,796	4,812,133	4,820,045
4,764,728	4,800,175	4,812,178	4,820,397
4,765,717	4,800,404	4,812,311	4,820,840
4,766,135	4,800,597	4,812,810	4,821,370
4,767,293	4,800,639	4,812,872	4,822,261
4,768,227	4,800,681	4,812,971	4,828,210
4,769,018	4,800,980	4,813,365	4,828,469
4,770,493	4,801,330	4,813,481	4,829,072
4,771,350	4,801,980	4,813,657	4,829,787
4,774,963	4,802,226	4,813,687	
4,775,476	4,802,371	4,813,691	

Disclaimers

4,086,287.—*Warren W. Kaeding*, Westfield; *Lewis B. Young*, Kendall Park, both of N. J. SELECTIVE ETHYLATION OF MONO ALKYL BENZENES. Patent dated Apr. 25, 1978. Disclaimer filed Jan. 27, 1988, by the assignee, Mobil Oil Corp.

The term of this patent subsequent to April 25, 1995, has been disclaimed.

4,699,469.—*Heinz John*, Ottobrunn, *Josef Windele*, Puchheim, both of Fed. Rep. of Germany. CONTACT PRESSURE MECHANISM FOR A WEB-SHAPED IMAGE RECEIVING MATERIAL. Patent dated Oct. 13, 1987. Disclaimer filed July 17, 1989, by the assignee, Seimens Aktiengsellschaft.

Hereby enters this disclaimer to claims 1, 2, 6, and 7 of said patent.

4,761,686.—*Donald H. Willis*, Indianapolis, Ind. TV RECEIVER HAVING FREEZE FIELD DISPLAY. Patent dated Aug. 2, 1988. Disclaimer filed July 21, 1989, by the assignee, RCA Licensing Corp.

Hereby enters this disclaimer to claim 1 of said patent.

4,763,418.—*John A. Decker, Jr.*, Wailuku, Hi. AUTOMATIC SEXTANT. Patent dated Aug. 16, 1988. Disclaimer filed Aug. 3, 1989, by the assignee, Kuau Technology, Ltd.

The term of this patent subsequent to Nov. 24, 2004, has been disclaimed.

Dedication

4,747,859.—*David C. F. Gladman*, Toddington; *John D. Oakley*, London, both of England. AIR SEPERATION. Patent dated May 31, 1988. Dedication filed July 14, 1989, by the assignee, the BOC Group plc.

Hereby dedicates to the Public claims 1-12, of said patent.

Disclaimers and Dedications

4,560,691.—*George Y. Lesher*, Schodack; *Baldev Singh*, East Greenbush, both of N. Y. 5-(PHENYL)-1, 6-NAPHTHYRIDIN-2(1H)-ONES, THEIR CARDIOTONIC USE AND PREPARATION. Patent dated Dec. 24, 1985. Disclaimer and Dedication filed Sept. 18, 1989, by the assignee, Sterling Drug Inc.

Hereby disclaims and dedicates to the Public claims 16, 17 and 22 of said patent.

4,574,806.—*Brian D. McCarthy*, Miami, Fla. TUNNELLING DEVICE FOR PERIPHERAL VASCULAR RECONSTRUCTION. Patent dated Mar. 11, 1986. Disclaimer and Dedication filed July 13, 1989, by the assignee, Bio Nova Neo Technics Pty. Ltd.

Hereby disclaims and dedicates to the Public claims 1 through 19 of said patent.

4,763,983.—*P. Stephen Keith*, Rougemont, N. C. OPTICAL TRANSMISSION CABLE WITH MESSENGER. Patent dated Aug. 16, 1988. Disclaimer and Dedication filed Apr. 10, 1989, by the assignee, Sumitomo Electric Fiber Optics Corp.

Hereby disclaims and dedicates to the Public claims 4, 5 and 9 of said patent.

SPECIAL BOXES FOR MAIL

Special PTO mail box numbers should be used to allow forwarding of particular types of mail to the appropriate areas as quickly as possible. Such mail is forwarded directly to the appropriate area without being opened. Only the specified type of document should be placed in an envelope addressed to one of these boxes. If any documents other than the specified type identified for each box are addressed to that box, they will be delayed in reaching the appropriate area for which they are intended.

The following special boxes should be used only for their specified purpose. Address mail as follows:

Box _____
Commissioner of Patents and Trademarks
Washington, D.C. 20231

Box 3	Mail for the Office of Personnel from NFC.
Box 4	Mail for the Assistant Commissioner for External Affairs and the Office of Legislation and International Affairs.
Box 5	"No fee" mail related to trademarks.
Box 6	Mail for the Office of Procurement.
Box 7	Reissue applications for patents involved in litigation and subsequently filed related papers.
Box 8	All papers for the Office of the Solicitor except communications relating to pending litigation.
Box 9	Coupon orders for U.S. patent and trademark copies.
Box 10	Orders for certified copies of patent and trademark applications.
Box 11	Electronic Ordering Service (EOS).
Box 12	Contributions to the Examiner Education Program.
Box 13	Mail for the Employee and Labor Relations Division.
Box AF	Expedited procedure for processing amendments and other responses after final rejection.
Box FWC	Requests for File Wrapper Continuation Applications.
Box Interference	Communications relating to interferences and applications and patents involved in interference.
Box Issue Fee	All communications following the receipt of a PTOL-85, "Notice of Allowance and Issue Fee Due," and prior to the issuance of a patent should be addressed to Box Issue Fee, unless advised to the contrary. Assignments are the exception. Assignments should be submitted in a separate envelope and not be sent to Box Issue.
Box M. Fee	Correspondence related to a patent that is subject to the payment of a maintenance fee.
Box Non Fee Amendment	Non-fee amendments to patent applications. (Use Box AF for responses after final rejection.)
Box OED	Mail for the Office of Enrollment and Discipline.
Box Pat. Ext.	Applications for patent term extension.
Box PCT	Mail related to applications filed under the Patent Cooperation Treaty.
Box Reexam	Mail related to Reexamination.
Box SN	For fee and petitions under 37 CFR 1.182 to obtain date received and/or serial number for patent application *prior* to the Office's standard notification (return post card or the official "Filing Receipt," "Notice to File Missing Parts," or "Notice of Incomplete Application").
PATENT APPLICATION	New patent application and associated papers and fees.
TRADEMARK APPLICATION	New trademark application and associated papers and fees.
Box Assignments	All assignment documents except those filed in new patent applications.

Reference Collection of U.S. Patents Available for Public Use in Patent Depository Libraries

The following libraries, designated as Patent Depository Libraries (PDLs), receive current issues of U.S. Patents and maintain collections of earlier-issued patents. The scope of these collections varies from library to libary, ranging from patents of only recent years to all or most of the patents issued since 1790.

These patent collections, which are organized in patent number sequence, are available for use by the public free of charge. Each of the PDLs, in addition, offers supplemental reference publications of the U.S. Patent Classification System, including the *Manual of Classification, Index to the U.S. Patent Classification, Classification Definitions*, and provides technical staff assistance in their use to aid the public, in gaining effctive access to information contained in patents. CASSIS (Classification And Search Support Information System); which provides direct, on-line access to Patent and Trademark Office data, is available at all PDLs. Facilities for making paper copies of patents from either microfilm or paper collections are generally provided for a fee.

Since there are variations in the scope of patent collections among the PDLs and in their hours of service to the public, anyone contemplating use of the patents at a particular library is urged to contact that library, in advance, about its collection and hours in order to avert possible inconvenience.

State	*Name of Library*	*Telephone Contact*
Alabama	Auburn University Libraries	(205) 844-1747
	Birmingham Public Library	(205) 226-3680
Alaska	Anchorage: Z. J. Loussac Public Library	(907) 261-2916
Arizona	Tempe: Noble Library, Arizona State University	(602) 965-7607
Arkansas	Little Rock: Arkansas State Library	(501) 682-2053
California	Los Angeles Public Library	(213) 612-3273
	Sacramento: California State Library	(916) 322-4572
	San Diego Public Library	(619) 236-5813
	Sunnyvale Patent Clearinghouse	(408) 730-7290
Colorado	Denver Public Library	(303) 571-2347
Connecticut	New Haven: Science Park Library	(203) 786-5447
Delaware	Newark: University of Delaware Library	(302) 451-2965
Dist. of Columbia	Washington: Howard University Libraries	(202) 636-5060
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Georgia	Atlanta: Price Gilbert Memorial Library, Georgia Institite of Technology	(404) 894-4508
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Illinois	Chicago Public Library	(312) 269-2865
	Springfield: Illinois State Library	(217) 782-5430
Indiana	Indianapolis-Marion County Public Library	(317) 269-1741
Iowa	Des Moines: State Library of Iowa	(515) 281-4118
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Massachusetts	Amherst: Physical Sciences Library, University of Massachusetts	(413) 545-1370
	Boston Public Library	(617) 536-5400 Ext. 265
Michigan	Ann Arbor: Engineering Transportation Library, University of Michigan	(313) 764-7494
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Missouri	Kansas City: Linda Hall Library	(816) 363-4600
	St. Louis Public Library	(314) 241-2288 Ext. 376
Montana	Butte: Montana College of Mineral Science and Technology Library	(406) 496-4281
Nebraska	Lincoln: Engineering Library, University of Nebraska-Lincoln	(402) 472-3411
Nevada	Reno: University of Nevada-Reno Library	(702) 784-6579
New Hampshire	Durham: University of New Hampshire Library	(603) 862-1777
New Jersey	Newark Public Library	(201) 733-7782
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New Mexico	Albuquerque: University of New Mexico General Library	(505) 277-4412
New York	Albany: New York State Library	(518) 473-4636
	Buffalo and Erie County Public Library	(716) 858-7101
	New York Public Library (The Research Libraries)	(212) 714-8529
North Carolina	Raleigh: D.H. Hill Library, North Carolina State University	(919) 737-3280
Ohio	Cincinnati and Hamilton County, Public Library of	(513) 369-6936
	Cleveland Public Library	(216) 623-2870
	Columbus: Ohio State University Libraries	(614) 292-6175
	Toledo/Lucas County Public Library	(419) 259-5212
Oklahoma	Stillwater: Oklahoma State University Library	(405) 744-7086
Oregon	Salem: Oregon State University	(503) 378-4239
Pennsylvania	Philadelphia, The Free Library of	(215) 686-5331
	Pittsburgh, Carnegie Library of	(412) 622-3138
	University Park: Pattee Library, Pennsylvania State University	(814) 865-4861
Rhode Island	Providence Public Library	(401) 455-8027
South Carolina	Charleston: Medical University of South Carolina Library	(803) 792-2371
Tennessee	Memphis & Shelby County Public Library and Information Center	(901) 725-8876
	Nashville: Stevenson Science Library,Vanderbilt University	(615) 322-2775

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	Dallas Public Library	(214) 670-1468
	Houston: The Fondren Library, Rice University	(713) 572-8101 Ext.2587
Utah	Salt Lake City: Marriott Library, University of Utah	(801) 581-8394
Virginia	Richmond: Virginia Commonwealth University Library	(804) 367-1104
Washington	Seattle: Engineering Library, University of Washington	(206) 543-0740
Wisconsin	Madison: Kurt F. Wendt Library, University of Wisconsin Madison	(608) 262-6845
	Milwaukee Public Library	(414) 278-3247

PATENT EXAMINING CORPS

JAMES E. DENNY, Acting Assistant Commissioner
STEPHEN G. KUNIN, Acting Deputy Assistant Commissioner
CONDITION OF PATENT APPLICATIONS AS OF September 23, 1989

PATENT EXAMINING GROUPS	Actual Filing Date of Oldest New Case Awaiting Action
CHEMICAL EXAMINING GROUPS	
GENERAL METALLURGICAL, INORGANIC, PETROLEUM AND ELECTRICAL CHEMISTRY, AND ENGINEERING, GROUP 110—D. E. TALBERT, Director	5-26-87
ORGANIC CHEMISTRY GROUP 120—S. N. ZAHARNA, Director	6-16-87
SPECIALIZED CHEMICAL INDUSTRIES AND CHEMICAL ENGINEERING, GROUP 130—R. F. WHITE, Director	4-15-87
HIGH POLYMER CHEMISTRY, PLASTICS, COATING, PHOTOGRAPHY, STOCK MATERIALS AND COMPOSITIONS, GROUP 150—J. O. THOMAS, Director	5-14-87
BIOTECHNOLOGY, GROUP 180—J. E. KITTLE, Director	7-30-86
ELECTRICAL EXAMINING GROUPS	
INDUSTRIAL ELECTRONICS, PHYSICS AND RELATED ELEMENTS, GROUP 210—D. G. Kelly, Director	5-4-87
SPECIAL LAWS ADMINISTRATION, GROUP 220—K. L. CAGE, Director	2-26-87
INFORMATION PROCESSING, STORAGE, AND RETRIEVAL, GROUP 230—G. GOLDBERG, Director	5-28-87
PACKAGES, CLEANING, TEXTILES, AND GEOMETRICAL INSTRUMENTS, GROUP 240—TRYGVE M. BLIX, Director	5-27-88
ELECTRONIC AND OPTICAL SYSTEMS AND DEVICES, GROUP 250—EDWARD E. KUBASIEWICZ, Director	8-18-87
COMMUNICATIONS, MEASURING, TESTING AND LAMP/DISCHARGE GROUP, GROUP 260 S. LEVY, Acting Director	7-2-87
DESIGN, GROUP 290—K. L. CAGE, Director	2-6-86
MECHANICAL EXAMINING GROUPS	
HANDLING AND TRANSPORTING MEDIA, GROUP 310—B. R. GRAY, Director	1-12-88
MATERIAL SHAPING, ARTICLE MANUFACTURING AND TOOLS, GROUP 320—N. GODICI, Acting Director	4-13-88
MECHANICAL TECHNOLOGIES AND HUSBANDRY PERSONAL TREATMENT INFORMATION, GROUP 330—J. J. LOVE, Director	4-20-87
SOLAR, HEAT, POWER, AND FLUID ENGINEERING DEVICES, GROUP 340—C. CROYLE, Acting Director	2-26-88
GENERAL CONSTRUCTIONS, PETROLEUM AND MINING ENGINEERING, GROUP 350—A. L. SMITH, Director	1-3-89

Expiration of patents: The patents within the range of numbers indicated below expire during September 1989, except those which may have had their terms curtailed by disclaimer under the provisions of 35 U.S.C. 253. Other patents, issued after the dates of the range of numbers indicated below, may have expired before the full term of 17 years for the same reasons, or have lapsed under the provisions of 35 U.S.C. 151.

Patents ..... Numbers 3,688,314 to 3,694,813 inclusive
Plant Patents ..... None

REISSUES

OCTOBER 31, 1989

Matter enclosed in heavy brackets [ ] appears in the original patent but forms no part of this reissue specification; matter printed in italics indicates additions made by reissue.

Re. 33,102

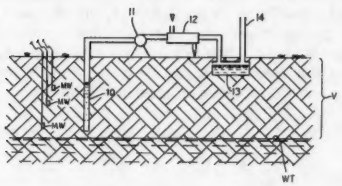
REMOVAL OF VOLATILE CONTAMINANTS FROM THE VADOSE ZONE OF CONTAMINATED GROUND

Melvin J. Visser, Portage, Mich., and James J. Malot, Dorado, P.R., assignors to The Upjohn Company, Kalamazoo, Mich.

Original No. 4,660,639, dated Apr. 28, 1987, Ser. No. 826,713, Feb. 6, 1986. Continuation of Ser. No. 567,972, Jan. 4, 1984, Pat. No. 4,590,760. Application for reissue Jul. 12, 1988, Ser. No. 218,154

Int. Cl.[4] E21B *43/00*

U.S. Cl. 166—267 8 Claims



1. A process for removing a not-naturally-occurring, volatile liquid contaminant from a contaminated araa of the earth, wherein the contaminated area of the earth has a subsurface water table and a subsurface vadose zone above the water table, the contaminant being present in the vadose zone, which comprises the steps of:

establishing a borehole extending downwardly from the surface of the ground within the contaminated area;

placing a first conduit within said borehole so that a ring-shaped zone is formed between the wall of said borehole and said conduit, said conduit having a perforate lower portion located in the vadose zone and spaced vertically above the water table so that fluids can flow from the vadose zone into the interior of said conduit, said perforate lower portion having an upper end and a lower end, said conduit having an imperforate upper portion above the upper end of said perforate lower portion [,]*;*

filling fluid-permeable first fill material into a lower portion of said ring-shaped zone around said perforate lower portion of said conduit and which extends to the upper end of said perforate lower portion so that said first fill material will permit fluid readily to flow into said perforate lower portion of said conduit;

filling a second fill material of low fluid permeability into an upper portion of said ring-shaped zone around said imperforate upper portion of said conduit, said second fill material being effective to impede flow of air from the surface of the ground to the lower portion of the borehole;

applying a vacuum to the upper end of said conduit effective to induce flow of air and a gas containing vapor of said contaminant present in said vadose zone into the lower portion of said conduit and thence to the upper end of said conduit, the vacuum being effective to cause vaporization of a substantial quantity of said contaminant within the vadose zone around the borehole so that said contaminant is removed from the ground in vapor form.

Re. 33,103

STRAINER

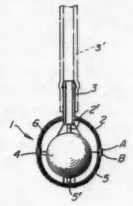
Akira Nagashima, Kawasaki, Japan, assignor to Kioritz & Corporation, Japan

Original No. 4,428,835, dated Jan. 31, 1984, Ser. No. 394,396, Jul. 1, 1982. Continuation of Ser. No. 824,212, Jan. 30, 1986, abandoned. Application for reissue Apr. 21, 1988, Ser. No. 186,694

Claims priority, application Japan, Jul. 8, 1981, 56-100657[U]

Int. Cl.[4] B01D *35/28*

U.S. Cl. 210—172 16 Claims



2. A strainer for removing impurities from a liquid being transferred from a body of the liquid to a liquid sucking device, said strainer comprising:

a perforate shell having an inside surface defining an internal cavity and exposed surface means on the shell to facilitate free rolling of the outer surface of the shell in contact with a surface on a tank confining the body of liquid;

a single flexible liquid sucking tube means for delivering liquid to a liquid sucking device and for attaching the shell to a liquid sucking device so that the shell changes its posture readily in response to a change in posture of the liquid sucking device;

outlet means for communicating said cavity with the liquid sucking tube means;

a strainer element associated with the perforate shell to capture and thereby prevent impurities in a body of liquid from reaching said internal cavity;

a weight having an outer surface; and

means mounting the weight substantially entirely within the cavity and in spaced relationship to at least a portion of the inside surface of the shell and the outlet means for the cavity so that the outer surface of the weight and inside surface portion of the shell cooperatively establish a flow path through said cavity communicating with said outlet means for conducting strained liquid through the shell and to the sucking device.

Re. 33,104

ROCK CLIMBING ADJUSTABLE CHOCK

Peter C. Taylor, 1222 N. DeJoy St., Santa Maria, Calif. 93454

Original No. 4,575,032, dated Mar. 11, 1986, Ser. No. 719,990, Apr. 4, 1985. Application for reissue Sep. 14, 1987, Ser. No. 96,920

Int. Cl.[4] A47G *29/00*

U.S. Cl. 248—231.2 14 Claims

8. A rock climbing adjustable chock of the type having opposed pivotal cams the improvement comprising:

(a) a bifurcated yoke handle having a hole in each fork on the first end and a second end;

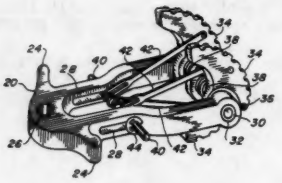
(b) a shaft tensionally positioned between said forks of the handle, each end urgingly supported within said holes;

(c) a plurality of opposed cams rotatably positioned on said

shaft, at least one pivoting in one direction and at least a pair pivoting in the opposite direction, for gripping the inside surface of a crack in a rock;

(d) a plurality of torsional springs disposed upon said shaft with each end pivotally fixed to said cam urging opposed rotation thereof;

(e) a pull rod slideably disposed relative to each fork and free to move transversely fore and aft, providing a gripping surface for actuation of said chock; and;



(f) a plurality of connecting links, each link freely reciprocable having one end pivotally mounted on the periphery of said cam and the other end slidably joined to said pull rod for retractably rotating said spring loaded opposed cams when sliding said pull rod toward said second yoke end while being inserted into an open rock fault, further providing an adjustable device to which a climbing rope may be attached to arrest a fall.

Re. 33,105

SEPARATION OF MANNOSE BY SELECTIVE ADSORPTION ON ZEOLITIC MOLECULAR SIEVES

John D. Sherman, Chappaqua, and Chien C. Chao, Millwood, both of N.Y., assignors to UOP, Des Plains, Ill.

Original No. 4,471,114, dated Sep. 11, 1984, Ser. No. 454,646, Dec. 30, 1982. Application for reissue Sep. 9, 1986, Ser. No. 51,271

Int. Cl.[4] C07H *1/06*; C13D *3/12*

U.S. Cl. 536—127 **51 Claims**

15. A selective adsorption process for the separation of glucose from a mixture containing glucose and xylose which comprises contacting said mixture at a pressure sufficient to maintain the mixture in the liquid phase with an adsorbent composition comprising at least one crystalline aluminosilicate zeolite selected from the group consisting of BaY, NaX, CaY and mixtures thereof, whereby glucose is selectively adsorbed thereon, removing the non-adsorbed portion of said mixture from contact with the zeolite adsorbent and desorbing the adsorbent therefrom by contacting said adsorbent with a desorbing agent and recovering glucose.

PLANT PATENTS

GRANTED OCTOBER 31, 1989

Illustrations for plant patents are usually in color and therefore it is not practicable to reproduce the drawing.

7,051
MINIATURE ROSE PLANT

Gijsbert de Ruiter, Hazerswoude, Netherlands, assignor to de Ruiter's Nieuwe Rozen B.V., Netherlands

Filed Sep. 15, 1988, Ser. No. 245,008
Int. Cl.[4] A01H *5/00*
U.S. Cl. Plt.—9 **1 Claim**

1. A new and distinct variety of rose plant of the miniature rose class, substantially as shown and described, characterized particularly by a plant suitable for growing in pots and by attractive light pink flowers which are long lasting on the plant.

7,052
HYBRID TEA ROSE PLANT NAMED BURAM

Joseph Winchel, Harbor City, Calif., assignor to Larry J. Burks, Tyler, Tex.

Filed Nov. 7, 1988, Ser. No. 268,937
Int. Cl.[4] A01H *5/00*
U.S. Cl. Plt.—21 **1 Claim**

1. A new and distinct variety of rose plant of the hybrid tea class, substantially as shown and described, characterized particularly by flowers with exhibition form and brilliant red coloration.

PATENTS

GRANTED OCT. 31, 1989

ERRATA

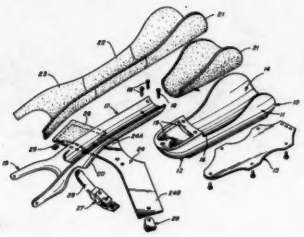
For CLASS	See PATENT NO.
460-097	4,877,039
165-181	4,877,087
206-459	4,877,119
220-269	4,877,129
209-601	4,877,138
206-514	4,877,151
248-298	4,877,204
356-350	4,877,311
418-051	4,877,379
075-005	4,877,445
552-204	4,877,559
156-610	4,877,573
585-751	4,877,581
426-087	4,877,609
428-645	4,877,696
428-034	4,877,705
548-336	4,877,801
525-146	4,877,813
252-344	4,877,842
544-227	4,877,873
528-272	4,877,922
219-381	4,877,990
371-005	4,878,049
367-137	4,878,210
374-166	4,878,226

PATENTS

GRANTED OCTOBER 31, 1989

GENERAL AND MECHANICAL

4,876,745
KNEE PADS
Lee E. Richards, 1681 Devine Rd., North Whitfield, Me. 04253
Filed May 12, 1988, Ser. No. 192,912
Int. Cl.[4] A41D *13/00*
U.S. Cl. 2—24 **19 Claims**



1. A knee pad attachable to a lower leg, said knee pad including a flat bottomed support of a length, when so attached and the knee bent with the wearer in a kneeling position, such as to underlie the knee cap and an adjacent portion of the tibia, the upper portion of said support having a concavity for the knee cap and provided with a cushioning layer and including a leg-receiving channel provided with a cushioning layer and inclined away from the surface on which the wearer is kneeling and extending beyond the support and towards the foot of said leg, and means connected to the channel and operable to secure the channel to the leg about the calf, a substantial percentage of the weight of the wearer transmitted to the surface through that part of the support underlying said adjacent portion of the tibia.

4,876,746
ENVIRONMENTAL PROTECTIVE GARMENT
Robin M. Howie, Edinburgh, Scotland, assignor to Coal Industry (Patents) Limited, United Kingdom
Filed Mar. 7, 1988, Ser. No. 164,918
Claims priority, application United Kingdom, Mar. 6, 1987, 8705263
Int. Cl.[4] A41D *13/00*
U.S. Cl. 2—69 **5 Claims**

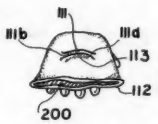
1. An environmental protective garment for use in a dust free clean room to prevent dispersal of particulate matter from the body of the wearer but permitting the wearer to avoid excessive body heat buildup, said garment comprising

a suit of partly air resistant material to cover substantially the entire body of the wearer and having a seal around parts of the wearer's body extending beyond the garment;

air mover means connected to said garment to draw air through said partly air resistant material so as to provide a negative pressure within said garment;

a filter or scrubber for gas connected to said garment downstream from the air mover means.

4,876,747
GLOVE WITH EASY SAFE REMOVAL MEANS
Carl E. Coffey, and Darlene M. Coffey, both of 8408 Garland Rd., Pasadena, Md. 21122
Filed May 4, 1988, Ser. No. 190,076
Int. Cl.[4] A41D *19/00*
U.S. Cl. 2—168 **7 Claims**



1. A surgical glove adapted to be worn on the human hand for protection against or deterring the transmission of, chemical or biological contamination, comprising;

a unitary glove body of impervious elastomeric material having palm and back portions terminating in a wrist portion providing an opening extending substantially transversely of the length of the glove,

removal means on the exterior of said back portion of said wrist portion adjacent to said opening,

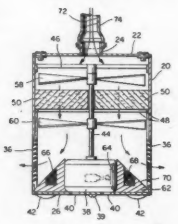
said removal means including an elongated loop member having distal portions and an intermediate portion, and

said loop member distal portions affixed relative said glove back portion with said elongated loop member disposed substantially parallel to said opening and said loop member intermediate portion substantially spaced from said back portion to define an open unobstructed clearance therebetween when said elastomeric glove is being worn, whereby

transmission of contamination on the exterior of the glove is deterred upon removal of the glove as a user employs a hook member within said loop member open clearance to engage said loop member intermediate portion to remove the glove from the hand by pulling it, in an inverted man-

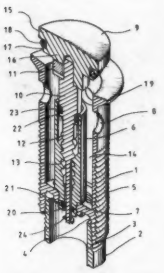
ner, back upon itself, beginning at said wrist portion opening.

4,876,748
TOILET ODOR FILTER ASSEMBLY
Duk K. Chun, 6811 - 32 Avenue, Edmonton, Canada (T6K 1L8)
Filed Mar. 3, 1988, Ser. No. 163,773
Int. Cl.[4] E03D *9/05*
U.S. Cl. 4—213 3 Claims



1. A toilet bowl ventilating and deodorizing structure for use in conjunction with a bathroom toilet bowl and seat assembly, said structure including a hollow housing having inlet and outlet openings, said inlet opening being adapted to have the outlet end of conduit means extending from the upper rim portion of the toilet bowl operatively communicated therewith, said housing including opposite end walls and peripheral side walls extending between and interconnecting said end walls, one of said end walls being removably mounted relative to the remainder of said housing and havng said inlet opening formed therein, motor means nmounted within said housing adjacent the other end wall thereof and including a rotatable output shaft exposed end portion, an intermediate length portion of said housing including air filtering means removably supported therein and extending thereacross and incorporating a pair of separate filter panels disposed on opposite sides of an intermediate portion of said exposed end portion of said shaft, one of said peripheral walls including at least a portion thereof removably supported from the remainder of said housing and closing a lateral opening defined by said housing registered with said air filtering means and through which said panels may be separately removed for replacement or servicing, said shaft exposed end portion including first axial flow impeller means mounted thereon between said filter means and said one end wall and second axial flow impeller means mounted thereon between said filter means and said motor means, at least one of said peripheral walls including a portion thereof spaced therealong from said second axial flow impeller means toward said motor having said outlet opening formed therein, said housing including at least two opposite side outlet openings formed therein and support means adjacent said other end wall supporting a deodorizing agent closely adjacent said outlet openings, said support means comprises a body mounted against the inner surface of said other end wall and including a center recess in which said motor is seated, said body supporting said deodorizing agent therefrom intermediate said recess and the outer peripheral portions of said body.

4,876,749
TWIST DRAIN
Frank Antoniello, Commack, N.Y., assignor to I.W. Industries, Inc., Melville, N.Y.
Continuation-in-part of Ser. No. 183,256, Apr. 8, 1988, abandoned, which is a continuation-in-part of Ser. No. 68,619, Jun. 30, 1987, abandoned. This application Nov. 15, 1988, Ser. No. 271,731
Int. Cl.[4] A47K *1/14;* F16K *31/50*
U.S. Cl. 4—295 8 Claims



1. A twist drain, comprising a cylindrical drain element mountable on a tail piece, and including a brace, a holding member, said holding member supported within said cylindrical drain element by said brace, and a rotatable member which is supported in said holding member rotatably between open and closed positions and including closure means to respectively permit and interrupt a flow of fluid through the twist drain, between said cylindrical drain element and said holding member;

thread means rotatably connecting said rotatable member with said holding member;

sealing means located in the region of said thread means and sealing the latter so as to prevent penetration of debris and foreign matter to said thread means;

said sealing means includes at least one O-ring provided between said rotating member and said holding member in the region of said thread means; and

said sealing means includes a further such O-ring provided between said rotating member and said holding member in the region of said thread means, said rotating member and said holding member being extended lengthwise in an elongated direction, said thread means including a first thread provided on said holding member and a second thread provided on said rotating member and engageable with said first thread, each of said threads having two ends spaced from one another in the lengthwise elongated direction, said O-rings being located outwardly beyond said ends of said threads as considered in the lengthwise elongated direction.

4,876,750
WATER CLOSET AND BIDET APPARATUS
Michael T. Broyles, 7720 Pinkney St., Omaha, Nebr. 68134
Filed Sep. 11, 1987, Ser. No. 96,511
Int. Cl.[4] A47K *3/20*
U.S. Cl. 4—420.4 42 Claims

1. Water closet and bidet apparatus, comprising:

bowl means having an upper enlarged opening and defining a fluid reservoir having a generally elongated hemispheric shape, said bowl means having a discharge opening in the bottom portion thereof and connected to a discharge siphon, said bowl means having a flushing channel for passing fluid into said reservoir;

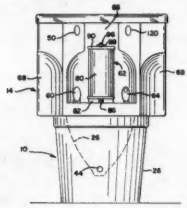
tank means located rearwardly and upwardly of said bowl

means and defining a reservoir for receiving fluid for flushing said bowl means, said tank means having a lower outlet opening in communication with said flushing channel, and said tank means having a width that exceeds the width of said bowl means so that the sides of said tank means extend beyond the sides of said bowl means;

discharge valve means for discharging fluid to said flushing channel;

control means adapted to be operably connected to a source of fluid supply and to said discharge valve means, said control means including a manually operable control actuator that extends exteriorly of said tank means, which when actuated, opens said discharge valve means to discharge fluid from said tank means to said discharge channel, and thereby activates said source of fluid supply to replenish the fluid in said tank means;

means for dispensing fluid comprising a container adapted to be connected to a source of fluid and an outlet means for



dispensing fluid, said container being located adjacent the rear portion of said bowl means and the front portion of said tank means, said container being removable from said apparatus;

flow control means for interconnecting said fluid dispensing means with sources of hot and cold fluid, and including a manually adjustable valve means for controlling the proportion of hot and cold fluid to control the temperature of the fluid entering said fluid dispensing means and for controlling the volume of flow thereof; and,

a recess located in the outer front and said walls on each side of said tank means, each recess extending from a portion generally coextensive with the upper surface of said bowl means to a higher elevation, and extending from the side wall interiorly to a location generally coextensive with the sides of said bowl means, said recesses defining openings in which the knees of a user may extend when the user is sitting over the bowl means when facing the tank means.

4,876,751

AUTOMATIC TOILET FLUSH CONTROL SYSTEM

Larry W. Van Meter, Louisville, Ky., assignor to LineTech, Inc., Louisville, Ky.

Filed Dec. 15, 1987, Ser. No. 133,356

Int. Cl.[4] E03D *11/02, 5/10*

U.S. Cl. 4—431 **4 Claims**

1. An automatic flush control system for a toilet of the type employing a first water flow to slurry the waste contents in the toilet bowl and a second water flow to pump the waste water slurry from the bowl, the system comprising:

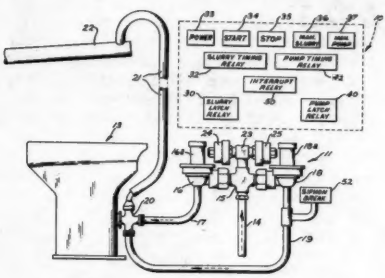
means for supplying input water from a pressurized supply line;

first solenoid operated valve means for initiating and maintaining the first water flow from the input water supply to the toilet for a predetermined slurry cycle time period as required to slurry the waste in the toilet bowl;

second solenoid operated valve means for initiating and maintaining the second water flow from the input water supply to the toilet for a predetermined pump cycle time period as required to pump out the waste water slurry from the toilet bowl;

control means responsive to a decrease in pressure of the input water supply for interrupting operation of the first and second valve means until the decrease in pressure is eliminated;

timing means providing a timing count coupled to the first and second valve means for setting the duration of each of said slurry and pump cycle time periods, said timing



means including means responsive to the control means for stopping and holding the timing count in the event of an interruption of one of said cycles and for resuming said timing count when said pressure is restored, whereby the cycle can be completed without prolongation of the predetermined duration thereof.

4,876,752

CONTROL DEVICE FOR AN AIR TURBULENCE MASSAGE DEVICE

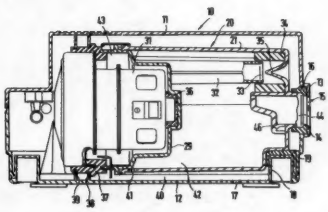
Heinz Bucher, Rottweil, Fed. Rep. of Germany, assignor to Metronic Electronic GmbH, Rottweil, Fed. Rep. of Germany

Filed Nov. 14, 1988, Ser. No. 271,204

Claims priority, application Fed. Rep. of Germany, Nov. 12, 1987, 3738364

Int. Cl.[4] A61H *33/02*

U.S. Cl. 4—542 **23 Claims**



1. A control device for an air turbulence massage device having a connecting piece for an air tube leading to a turbulence matting, an external housing having a lower and an upper housing part, a blower unit driven by motor means, a water discharge opening at a low point of said external housing, and a check valve device which when the blower unit is switched off prevents a backflow of water from said turbulence matting to said motor means and said blower unit, said control device comprising:

an internal housing (20) forming a separate compressed air distributing chamber (42) positioned in said external housing (10) outside of said blower unit (31);

said internal housing (20) having a connecting piece (44) for said air tube which is sealed off from said external housing (10) and is in communication with an insertion opening (15) of said external housing (10);

compressed air produced by said blower unit (31) flowable

through a compressed air connecting piece (32) into said compressed air distributing chamber (42) positioned above said connecting piece (44) for said air tube;

said internal housing (20) having an internal housing water discharge opening (41) at a low point of said compressed air distributing chamber (42) behind a mount of the control device;

said internal housing water discharge opening (41) of said compressed air distributing chamber (42) in communication with a water collecting chamber (40) formed between said lower housing part (12) of said external housing (10) and said internal housing (20), said water discharge opening (41) sealed off from said motor means and said blower unit (31); and

an external housing water discharge opening (17) positioned at a low point of said water collecting chamber (40) of said lower housing part (12) behind said mount of the control device.

4,876,753

AIR TURBULENCE MASSAGE DEVICE

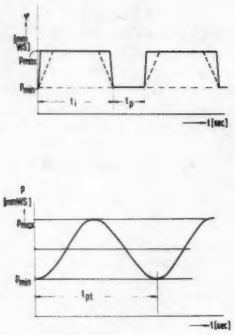
Heinz Bucher, Rottweil, Fed. Rep. of Germany, assignor to Metronic Electronic GmbH, Rottweil, Fed. Rep. of Germany

Filed Nov. 14, 1988, Ser. No. 271,205

Claims priority, application Fed. Rep. of Germany, Nov. 12, 1987, 3738363

Int. Cl.[4] A61H *33/02*

U.S. Cl. 4—542 **20 Claims**



1. A turbulence process for an air turbulence massage device having a control device accommodating a blower unit and a turbulence matting which is positionable in a bathtub, the turbulence matting being connected with the blower unit outlet by means of an air tube, a turbulence intensity and a duration of a turbulence process is selected by preset program means, the turbulence intensity of the turbulence process is adjusted by varying a rotational speed of the blower unit between a lower and an upper value, and the duration of the turbulence process is changed by a connection duration of the blower unit, the turbulence process steps comprising:

(a) presetting the lower value as a minimum pressure value (P_{min}) which overcomes a counter-pressure from a static head of a water level in the bathtub;

(b) predetermining the upper value as a maximum pressure value (P_{max});

(c) presetting at least one of the minimum pressure value (P_{min}) and the maximum pressure value (P_{max}) by at least one of manual means and the program means; and

(d) during preselected time intervals (t_i,t_p) of the turbulence process, abruptly switching the turbulence intensity between at least one of: (1) the preset minimum pressure value (P_{min}) and the preselected maximum pressure value (P_{max}); and (2) predetermined time intervals (t_{pt}) to alternately increase and decrease the turbulence intensity.

11. An air turbulence massage device having a control device accommodating a blower unit and a turbulence matting which is positionable in a bathtub, said turbulence matting being connected with said blower unit outlet by means of an air tube, a turbulence intensity and a duration of turbulence selectable by means of a preset program, said turbulence intensity adjustable by a variable rotational speed of said blower unit operating between a lower and an upper value, and said duration of turbulence changeable by operating said blower unit, said air turbulence massage device comprising: presetting means for presetting said lower value as a minimum pressure value (P_{min}) which overcomes a counter-pressure from a static head of a water level in said bathtub, predetermining means for predetermining said upper value as a maximum pressure value (P_{max}), at least one of manual preset means and program means for presetting at least one of said minimum pressure value (P_{min}) and said maximum pressure value (P_{max}), and switching means for abruptly switching said turbulence intensity between at least one of: (1) said preset minimum pressure value (P_{min}) and said preselected maximum pressure value (P_{max}); and (2) predetermined time intervals (t_{pt}) to alternately increase and decrease said turbulence intensity.

4,876,754

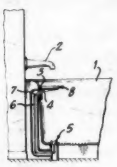
BATHTUB SILENCER AND OVERFLOW PROTECTOR

Miklos G. Kurz, 300 Winston Dr., Cliffside Park, N.J. 07010

Filed Jan. 22, 1988, Ser. No. 146,822

Int. Cl.[4] A47K *3/00*

U.S. Cl. 4—546 **8 Claims**



1. A collector and silencer unit for use in a bathtub having an overflow, for intercepting the water discharged from a spout, disposed above said unit in its free fall and redirecting it towards the back wall of the bathtub wherein said unit comprises:

a bottom wall, side walls and a back wall defining an open top receptacle, said bottom wall slanting downwardly toward said back wall, said back wall including means for mounting on a bathtub wall below a spout, flowpath means adjacent the intersection of said back wall, bottom wall, and side walls for directing the flow of water along the bathtub wall, whereby water from said spout is collected and silenced by being directed along the inside surface of a bathtub.

4,876,755

TOTAL BACK SUPPORT SYSTEM

Deborah Parrish, 12 Glenn Ter., Vineland, N.J. 08360

Filed Aug. 25, 1988, Ser. No. 236,233

Int. Cl.[4] A47C *20/08*

U.S. Cl. 5—431 **22 Claims**

1. A back support device comprising at least two cushion devices, each cushion device comprising:

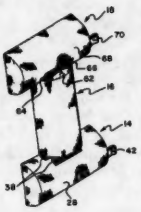
(a) a semicylindrical resilient cushion, the halving being through a lengthwise central axis of a cylinder, the cushion comprising a flat rectangular surface, a semicylindrical surface, and two semicircular end surfaces, and

(b) at least two hook or loop fabric fastening means attached on surfaces of the cushion device, each fastening means to

detachably fasten to a complimentary hook or loop fabric fastening means on a surface of another cushion device,

wherein one of said cushion devices is a first cushion comprising a first hook or loop fabric fastening means positioned on the rectangular surface and a second hook or loop fabric fastening means on an end surface,

wherein a second of said cushion devices is a second cushion comprising a first hook or loop fabric fastening means positioned on the rectangular surface and a second hook or loop fabric fastening means on the semicylindrical surface positioned intermediate the length of the semicylindrical surface and proximate a lengthwise edge,



wherein the first hook or loop fabric fastening means on the first and second cushion devices are positioned to fasten together to form a cylindrical shaped support device, and

wherein the second hook or loop fabric fastening means on the first and second cushions are positioned to fasten together to form a "T" shaped support device with the two rectangular surfaces facing in a same direction.

4,876,756

AIR MATTRESS

Nicola Vaccaro, Niagara Falls, Canada, assignor to Nick Vaccaro International, Niagara Falls, Canada

Continuation-in-part of Ser. No. 861,450, May 9, 1986, Pat. No. 4,723,329. This application Feb. 8, 1988, Ser. No. 154,454

The portion of the term of this patent subsequent to Feb. 9, 2005, has been disclaimed.

Int. Cl.[4] A47C *27/10, 27/08*

U.S. Cl. 5—455 **18 Claims**

1. A posture supporting device having an inflatable air mattress with head and foot regions, said head region comprising an elongate recess extending in a length direction of said mattress, said recess having a depth approximating that of said mattress to receive and support a person's head when lying on said mattress in a prone position, said recess having an upper end and a lower end and being defined by opposing spaced-apart inflated mattress sections extending generally parallel to one another in said length direction of said mattress and lower means for closing off said recess lower end and upper means for closing off said recess upper end, said mattress sections being spaced-apart a distance which supports a person's head when a person is lying in a prone position by contacting a person's cheekbones and accommodating a person's mouth and nose to permit free breathing while lying in a prone position, means for elevating a user's lumbar region, said elevating means being associated with said mattress and positioned intermediate said head and foot regions, said elevating means elevating a user's lumbo-sacral region sufficiently to minimize hyper-extension in a user's lumbo-sacral region while a person is lying prone on said mattress, said elevating means further comprises a cushion, and means for attaching said cushion to said mattress.

4,876,757

TOOL FOR REPLACING NOZZLES ON CAULKING TUBES

Michael B. Wentworth, 7015 Buckingham Blvd., Berkeley, Calif. 94705

Filed Jun. 24, 1988, Ser. No. 211,209

Int. Cl.[4] B25F *1/04*

U.S. Cl. 7—158 **10 Claims**

3. A tool for allowing a user to replace the nozzle on a caulking tube, comprising:

a body having a flat end face and a peripheral wall, said peripheral wall being formed with a recess sized to accommodate at least a portion of the base region of the nozzle;

a blade mounted within said recess so that it is in a plane parallel to said end face and spaced a predetermined distance therefrom, said blade having an outwardly pointing edge spaced inwardly from said peripheral wall;

guard means for selectively exposing said blade, said guard means and said blade being relatively movable from a first position where said recess extends along said peripheral wall with said blade edge exposed to enable cutting the nozzle so as to leave a stub, and a second position wherein said recess is interrupted so that said blade edge is not exposed; and

a tap sized to cut internal threads in the stub, mounted to and extending outwardly from said body.

4,876,758

SYSTEM AND METHOD FOR FORMING CUSTOM-MADE SHOE INSERTS

Paul D. Rolloff, Fremont, and Reginald T. Lamb, Redwood City, both of Calif., assignors to Amfit Inc., Sunnyvale, Calif.

Filed Mar. 31, 1987, Ser. No. 34,077

Int. Cl.[4] A43D *09/00;* A61F *03/00*

U.S. Cl. 12—142 N **13 Claims**

1. Apparatus for digitizing the undersurface of a person's foot, said apparatus comprising:

an array of gauging elements, each of aid gauging elements including an activator;

a frame for supporting the person's foot and for supporting the gauging elements in spaced relationship for independently guided movement towards the undersurface of the person's foot;

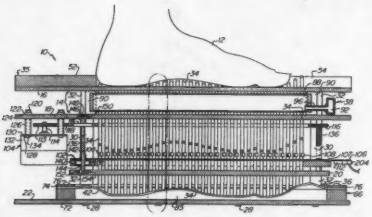
control means, supported by the frame, for urging the gauging elements into contact with the undersurface of the person's foot;

sensor means, supported by the frame and movable relative

to the gauging elements, for scanning the gauging elements to sense the positions of the gauging elements and produce digital signals indicative of those positions;

said sensor means including a plurality of sensors, each corresponding to an associated one of the gauging elements, and a support structure, movably supported by the frame adjacent to each of the gauging elements, for supporting each of the sensors adjacent to the corresponding gauging element;

each of said sensors being operable, when moved adjacent to the activator of the corresponding gauging element, for



detecting that activator to sense the position of the corresponding gauging element and produce a digital signal indicative of that position;

control means, supported by the frame and coupled to the support structure of the sensor means, for moving the support structure and the sensors supported thereon relative to the gauging elements to scan the gauging elements; and

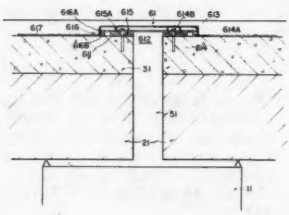
storage means, coupled to the sensor means, for storing the digital signals indicative of the positions of the gauging elements to provide a digital representation of the undersurface of the person's foot.

4,876,759

BRIDGE EXPANSION JOINT

Jesse S. Yang, No. 28, Sec. 2, Chung Cheng Rd., Shih Lin, Taipei, Taiwan

Filed Jun. 14, 1988, Ser. No. 207,111
Int. Cl.[4] E01D *19/06*
U.S. Cl. 14—16.5 **1 Claim**



1. In a road bridge having a bridge deck including a reinforced concrete ground deck layer provided with an open expansion seam therein and with an upper surface of the ground deck being paved thereover by a road surface pavement, an expansion joint for buried inner placement below the road surface pavement in the expansion seam, the expansion joint comprising:

a pair of padded sheets fixed to the upper surface of the ground deck adjacent respective edges of the expansion seam;

a pair of padding slats fixed to the upper surface of the ground deck and spaced respectively outboard of padded sheets with respect to the expansion seam;

a steel plate superimposed over the padded sheets and padding slats on both sides of the expansion seam; the steel plate spanning the expansion seam;

a pair of sliding pads respectively fixed to an underside of the steel plate at respective locations thereof overlying and corresponding with the padded sheets fixed to the ground deck;

a second pair of padding slats respectively fixed to the underside of the steel plate at respective locations thereof overlying and corresponding with the first pair of padding slats fixed to the ground deck;

a plurality of rivets anchored in the ground deck on respective sides of the expansion seam, said rivets piercing the padded sheets and passing upwardly through expansion slots provided in the sliding pads and the steel plate, said rivets having flanged heads extending above an upper surface of the steel plate, wide edge ring washers being inserted between the upper surface of the steel plate and the flanged heads of the rivets;

a guard cover mounted on the steel plate over each rivet, each guard cover covering a respective expansion slot in the steel plate and accommodating the head of the rivet in said expansion slot; and

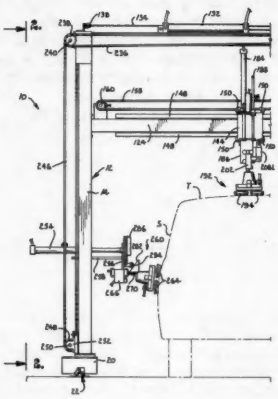
a wire screen extending outwardly from edges of the steel plate for receiving a road paving material layer.

4,876,760

APPARATUS FOR BUFFING AND OTHERWISE TREATING VEHICLE BODIES

William B. Rabourn, Route 1, Box 126, Sedalia, Mo. 65301, and Daniel R. Heckart, Sedalia, Mo., assignors to William B. Rabourn, Sedalia, Mo.

Filed Jun. 1, 1988, Ser. No. 201,574
Int. Cl.[4] B60S *3/06*
U.S. Cl. 15—97 B **19 Claims**



1. Apparatus for treating a vehicle body having opposite sides and a top, said apparatus comprising:

a frame including a pair of upright columns spaced apart from one another;

a carriage on each column mounted for up and down movement thereon;

means for moving each carriage up and down on the corresponding column;

a pair of side treatment heads mounted on the respective carriages for generally horizontal extension and retraction toward and away from the opposite sides of a vehicle body positioned between said columns;

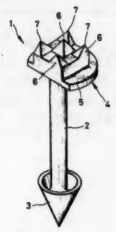
a substantially horizontal bridge extending between said columns at an elevated position to span the top of the vehicle body;
an overhead carriage mounted on said bridge for movement lengthwise thereon;
means for moving said overhead carriage along the bridge;
a top treatment head mounted on said overhead carriage for generally vertical extension and retraction toward and away from the top of the vehicle body;
treatment means on each treatment head for effecting a preselected treatment of the vehicle body when extended adjacent thereto and activated;
means for selectively extending and retracting each of said treatment heads; and
means for selectively activating said treatment means of each treatment head to effect said preselected treatment of the sides and top of the vehicle.

4,876,761

PIN FOR SWEEPERS

Shizuo Sagawa, 12-8, Minami Kugahara 1-chome,, Ota-ku, Japan

Filed Feb. 10, 1988, Ser. No. 154,228
Claims priority, application Japan, Jul. 31, 1987, 62-117773; Jul. 31, 1987, 62-117774
Int. Cl.[4] B08B *9/04*
U.S. Cl. 15—104.061 **7 Claims**



1. A pin for a sweeper for cleaning pipe, comprising:
A shaft portion;
an anchoring portion provided at a lower end of said shaft portion for being driven into the sweeper to prevent the pin from falling out of the sweeper; and
a head portion provided at an upper end of said shaft portion;
said head portion having a plurality of spaced, pointed projections having respective tip portions, said projections being disposed in such a manner that the tip portions thereof have a non-overlapping arrangement when said head portion is viewed from a side thereof.

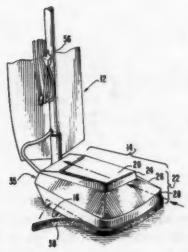
4,876,762

PORTABLE APPLIANCE COVER

David W. Foster, Germantown, Md., assignor to Soft Vac, Inc., Washington, D.C.

Filed Jul. 22, 1988, Ser. No. 223,093
Int. Cl.[4] A47L *9/00*
U.S. Cl. 15—247 **9 Claims**

1. A cover for a portable appliance, the appliance including a body section having a bottom surface disposed adjacent a floor when the appliance is in use, a top surface opposite the bottom surface and a side surface between and connecting the top and bottom surfaces, the cover comprising:
removable bonnet means for substantially covering one or more of the top surface and side surface of the body section and being capable of absorbing mechanical energy; and
retaining means for removably attaching said removable bonnet means to the body section of the appliances, said retaining means being capable of holding said bonnet means at a fixed space relationship to the bottom surface of the body section of the appliance to establish a selected spacing between the cover and the floor when the appliance is disposed on the floor, the portable cleaning appliance including an adjustable upright arm having one position wherein the arm is substantially perpendicular to the top section of the appliance, and said retaining means includes strap means to secure said bonnet means to said arm.

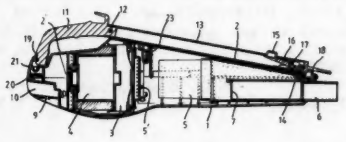


4,876,763

VACUUM CLEANER

Hae S. Cho, and In K. Kwon, both of Suwon, Rep. of Korea, assignors to Samsung Electronics Co., Ltd., Suwon, Rep. of Korea

Filed Dec. 22, 1988, Ser. No. 289,220
Claims priority, application Rep. of Korea, Dec. 31, 1987, 87-15664
Int. Cl.[4] A47L *9/32*
U.S. Cl. 15—329 **3 Claims**

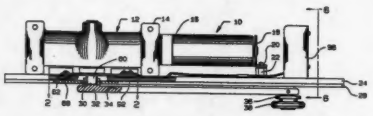


1. A vacuum cleaner comprising a body having an air suction port at a front end, and a plurality of air discharging openings at a back end, an air suction means placed inside said body, a suction nozzle attached to said air suction port, a front upper cap mounted on the front upper side of said body, a rear upper cap mounted on the rear upper side of said body, a handle incorporated with an extension member, a holding means provided on the free end of said extension member, a catching means provided on the front upper end of said front upper cap, a cup formed in the free end of said handle, a hooking means provided on the back side of said rear upper cap, and a catching hole formed into the back side of said body, characterized in that when said vacuum cleaner is used as a portable hand-carried type, said holding means of said extension member, and said cup of said handle, are immovably caught respectively by said catching means and said hooking means of said rear upper cap, and when said vacuum cleaner is used as a floor-carried, upright type, said holding means is inserted into said catching hole of said body and immovably caught therein.

4,876,764
CLOSER HAVING DOOR POSITION INDICATOR

Ralph T. Teague, Jr., Monroe, N.C., assignor to Yale Security Inc., Monroe, N.C.

Filed Oct. 17, 1988, Ser. No. 258,704
Int. Cl.[4] G08B *13/08*
U.S. Cl. 16—71 7 Claims



1. A door closer having a door position indicator, the closer having an operator arm associated at one end with the door and at the other end mounted on the lower end of a vertically disposed pinion shaft of the closer, the pinion shaft having a cam surface on its periphery adjacent its lower end, the indicator comprising:

a. a switch-operating lever having a rotatable, circular mount eccentrically mounting a pivot point of the lever, a portion of the lever engaging against the periphery of the pinion shaft,

b. electric switch means mounted adjacent the closer and adapted to be engaged by the lever,

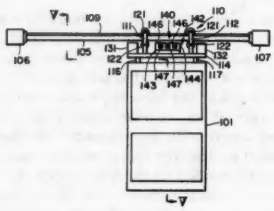
c. biasing means urging the lever toward the shaft,

d. signal means electrically connected to the switch means whereby when the door is closed, the cam surface on the shaft causes the lever to assume a position wherein the lever puts the switch in a first condition, and when the door is not closed the cam surface causes the lever to assume a different position wherein the lever puts the switch in a second condition, and for either condition the signal means indicates accordingly.

4,876,765
DOOR APPARATUS WITH MAGNETIC SUPPORT

Mitsuji Karita, Mie, Japan, assignor to Shinko Electric Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 48,418, May 11, 1987, abandoned, which is a continuation of Ser. No. 841,157, Mar. 19, 1985, Pat. No. 4,698,876. This application Jul. 1, 1988, Ser. No. 214,865
Claims priority, application Japan, Mar. 20, 1985, 60-40421; Mar. 20, 1985, 60-40422; Mar. 20, 1985, 60-40423; May 21, 1985, 60-75382
Int. Cl.[4] E05D *15/06*
U.S. Cl. 16—102 7 Claims



1. A door apparatus comprising:

(a) a door member movable between a closed position and an open position with respect to a stationary structure;

(b) an elongated guide member mounted on one of the door member and the stationary structure, and extending along the door member to help guide movement of the door member between the open and closed positions, the elongated guide member including

(i) an inner tube of magnetic material, and

(ii) an outer tube of non-magnetic and electrically conductive material;

(c) first magnet means mounted on the other of the door member and the stationary structure, to produce a propulsion magnetic force between the first magnet means and the elongated guide member to move the door member between the open and closed positions; and

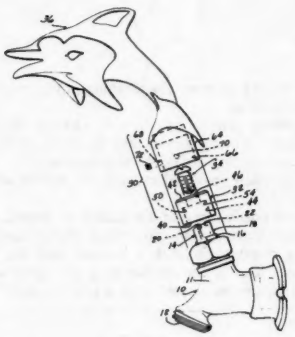
(d) second magnet means mounted on the other of the door member and the stationary structure, spaced from the elongated guide member, to produce a levitating magnetic force between the elongated guide member and the second magnet means to support at least part of the weight of the door member and to maintain the elongated guide member spaced from the first magnet means as the door member moves between the open and closed positions the second magnet means comprising a pair of electromagnetic units fixedly mounted on said other of the door member and the stationary structure, said electromagnetic units being spaced from each other and surrounding the elongated guide member to produce said levitating magnetic force to help support the door member and to help guide movement of the door member along the elongated guide member; and

the first magnet means comprising a travelling magnetic field generating unit fixedly mounted on said other of the door member and the stationary structure between the pair of electromagnetic units.

4,876,766
DECORATIVE FAUCET HANDLE MOUNTING APPARATUS

Richard K. Cohen, 2561 Hawthorn, Ann Arbor, Mich. 48104

Filed Dec. 27, 1988, Ser. No. 290,573
Int. Cl.[4] F16K *31/60*
U.S. Cl. 16—114 R 8 Claims



1. A decorative faucet handle assembly for a faucet having an outwardly extending rotatable stem with a longitudinal, threaded bore formed therein, comprising:

an adapter having a first bore complimentarily shaped to slidably fit in registry over the stem of a faucet;

a second bore formed in the adapter coaxial with the first bore and forming an extension of the first bore;

a first fastener means attachable to the faucet stem for fastening the adapter to the stem;

a decorative handle having a longitudinal handle bore extending inward from one end, the longitudinal handle bore being configured to be disposed in registry over the adapter;

a second bore formed in the decorative handle perpendicular to the longitudinal handle bore; and

a second fastener threadingly insertable through the second

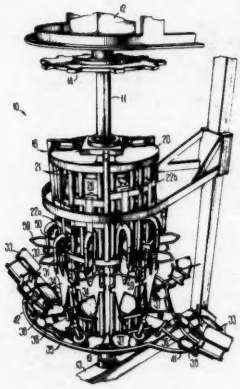
bore in the decorative handle into engagement with the adapter to secure the decorative handle to the adapter.

4,876,767

VENT CLEANING APPARATUS AND METHOD FOR POULTRY

Grover S. Harben, III, 3319 Edgewater Terr., Gainesville, Ga. 30501, and Leonard G. Clark, Route 2, Dawsonville, Ga. 30534

Filed Jun. 29, 1988, Ser. No. 213,247
Int. Cl.[4] A22C *21/00*
U.S. Cl. 17—11 **8 Claims**



8. Apparatus for cleaning the vent of fowl and for use in conjunction with an overhead conveyor for moving suspended fowl carcasses comprising:

a carousel support apparatus including a vertical rotatable shaft and a toothed wheel carried by the shaft for engagement by the overhead conveyor, whereby the shaft simultaneously rotates with movement of the conveyor;

a plurality of elongated members mounted in symmetrical relation around the shaft for rotation with the shaft, each elongated member having a forward end operative for insertion into the vent of a fowl;

fowl support means associated with each elongated member to engage a suspended fowl arriving on the conveyor and support that fowl with the vent in predetermined relation to the corresponding elongated member as the shaft rotates;

each elongated member including first and second fluid flow passages having openings communicating with the forward end;

The first passage selectively connected to a source of suction tending to draw fecal matter from the vent into the opening of the one passage;

the second passage selectively connected to introduce a flow of liquid within the vent so as to entrain the fecal matter for withdrawal through the first passage;

vertical positioning means associated with each elongated member to move the corresponding vertical member along a predetermined vertical path to enter the vent of a fowl supported in relation to the elongated member, and to withdraw the elongated member after the shaft has rotated a predetermined extent; and

valve means associated with the passages of each elongated member and operative in response to the rotary position of the shaft to initially apply suction to the first passage of each elongated member after that elongated member moves to enter the vent, to maintain the suction applied to the first passage while subsequently applying a liquid flow to the second passage for a time, and then to shut off that water flow and thereafter to remove the suction from each elongated member, so that liquid from the second passage enters the vent only while suction from the first passage is applied to the vent, thereby preventing injection of the liquid into the fowl beyond the forward end;

whereby fecal matter is withdrawn seriatim from the vent of each fowl moving along the conveyor.

4,876,768

FISH SCALING APPARATUS

Clarence K. Bright, Davison, Mich., assignor to Lil' Beaver Company, Davison, Mich.

Filed Mar. 1, 1989, Ser. No. 317,437
Int. Cl.[4] A22C *25/02*
U.S. Cl. 17—64 **5 Claims**

1. A fish scaling apparatus for removal of scales from fish, said apparatus comprising:

a container means for containing a predetermined quantity of fish suspended in water;

a scaling element rotatable about a substantially vertical axis, said scaling element including at least one horizontal rod member and at least one vertical rod member;

a plurality of scaling protrusions attached to and extending from at least one of said vertical or horizontal rod members, said scaling protrusions for scaling of the fish in response to relative motion between the fish and said scaling protrusions, said scaling protrusions providing for removing scales of the fish substantially without damage to the remaining portion of the fish; and

a manually operated means for providing rotational motion to said scaling element in said container means thereby providing contact between and relative motion between said scaling protrusions and said fish for scaling of said fish.

4,876,769

REGULATION OF PROCESSING STAGES OF A FIBER PROCESSING INSTALLATION

Walter Schlepfer, Winterthur, and Christoph Staeheli, Frauenfeld, both of Switzerland, assignors to Reiter Machine Works, ltd., Winterthur, Switzerland

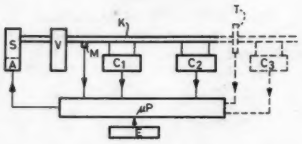
Filed Oct. 6, 1988, Ser. No. 254,407
Claims priority, application Switzerland, Oct. 8, 1987, 03943/87; Oct. 8, 1987, 03947/87
Int. Cl.[4] D01G *15/40*
U.S. Cl. 19—105 **14 Claims**

1. A fiber processing installation comprising

a plurality of fiber processing stages including at least one stage operable on a discontinuous basis;

conveying means interconnecting said stages for conveying fibers for processing in a preset sequence;

means for generating a signal representative of the total production of a second stage downstream of said one stage; and



control means for monitoring the actual ratio of operative time to inoperative time of at least said one stage, said control means being responsive to said signal from said signal generating means to form a set value for the operative to inoperative time ratio of said one stage for comparison with said actual ratio to change the production of said one stage in response to a difference therebetween in order to adjust said actual ratio to said set value.

4,876,770

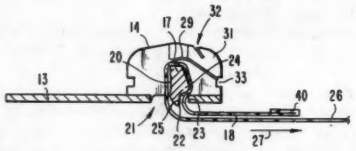
ANTI-CREEP CAM BAR

Jerry D. Bougher, Lebanon, Ind., assignor to Indiana Mills & Manufacturing, Inc., Westfield, Ind.

Filed Oct. 3, 1988, Ser. No. 252,151

Int. Cl.[4] A44B *11/12*

U.S. Cl. 24—170 **20 Claims**



1. A seat belt device comprising:

a web having a fixedly mountable proximal end and a free distal end;

a frame including mounting means and a web stop;

a bar movably mounted by said mounting means to said frame and having a locked position for holding said web tight to said frame and an unlocked position to allow said web to move around said bar and relative to said frame, said bar in said locked position applying pinching force to lock said web between said bar and said web stop; and,

spring means located on said bar laterally outward of said web extending between and received by said frame and said bar, said spring means operable to normally urge said bar to said locked position but yieldable to allow said bar to controllably move to said unlocked position, said spring means further operable to maintain said bar in said locked position even though said web momentarily loosens on said bar as web force from said proximal end to said bar is varied and until web force from said distal end to said bar moves said web and moves said bar away from said web stop.

4,876,771

PLASTIC CLIP PARTICULARLY USEFUL AS A CLOTHES PIN

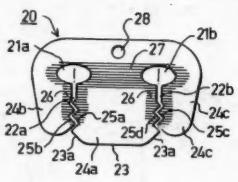
Izhak Givati, Tel Aviv, Israel, assignor to Shakbar Investments Ltd., Tel Aviv, Israel

Filed Aug. 9, 1988, Ser. No. 230,089

Claims priority, application Israel, Sep. 3, 1987, 83765

Int. Cl.[4] D06F *53/00*

U.S. Cl. 24—298 **14 Claims**



1. A plastic clip particularly useful as a clothes pin for hanging articles of clothing on a clothes line, comprising: a strip of an elastic plastic material formed with at least one opening therethrough for receiving the clothes line, and with a slot extending from said opening, for a length substantially greater than the size of the opening, to an edge of said strip to define a pair of jaws for gripping the article to be hung from the clothes line; the sides of said slot being formed with a zigzag configuration to define teeth on the edges of said jaws for gripping the article of clothing between them; the outer faces of said plastic strip bordering said slot being roughened to define non-slip surfaces for gripping the article engaged by said jaws.

4,876,772

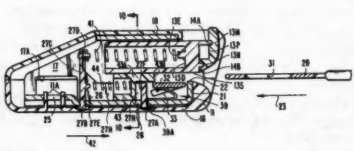
SAFETY BELT BUCKLE

James R. Anthony, Carmel; David Merrick, Indianapolis; Ronald F. Homeier, Plainfield, and Allan R. Lortz, Carmel, all of Ind., assignors to Indiana Mills & Manufacturing, Inc., Westfield, Ind.

Filed Feb. 25, 1988, Ser. No. 160,405

Int. Cl.[4] A44B *11/25*

U.S. Cl. 24—637 **24 Claims**



1. A buckle comprising:

a body having an entrance to admit a latchable tongue;

a latch member in said body and having a latching pawl thereon;

said latch member being pivotable in said body to enable said latching pawl to move into a latching position to interfere with movement of a tongue through said entrance;

guide means in said body defining a guideway for a release slide;

a release slide received in said guideway and having a pawl release cam thereon, said slide having a rest position and a release position, and normally biased to said rest position;

resilient means mounted between said body and said latch member and operating independently of said release slide and urging said pawl to said latching position;

said latch member having a cam follower engageable by said cam when said slide is moved from said rest position to

said release position to move said latching pawl out of said latching position; and

a spring loaded ejector behind said entrance and in the path of a latchable tongue when inserted through said entrance, and operable between a cocked position and a rest position;

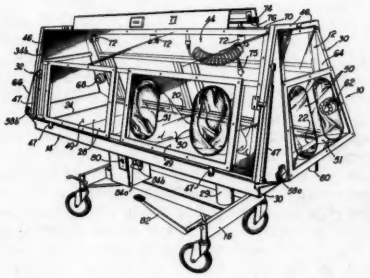
said ejector being movable along a path traveled by the tongue as the tongue is moved into the body through said entrance, and returnable along said path as the tongue is removed from the body.

4,876,773

ENCLOSED CONTAINMENT APPARATUS FOR POSTMORTEM SETTINGS

James D. Wade, Marietta, Ga., assignor to Kin, Inc., Atlanta, Ga.

Filed Jan. 11, 1989, Ser. No. 295,897
Int. Cl.[4] A61G *13/00*
U.S. Cl. 27—23.1 **25 Claims**



1. An autopsy device, comprising:

(a) a work surface upon which a body may be placed;

(b) an hermetically sealed chamber assembly on said work surface, at least a portion of said chamber assembly being movable between closed and opened positions to allow said body to be placed within said chamber assembly on said work surface, said chamber assembly further comprising:

(i) means for providing access of the hands of an operator into the interior of said chamber assembly when said chamber assembly is in said closed position; and

(ii) a transparent portion to allow said operator to view said body on said work surface;

(c) means for providing a decontaminant fluid to said interior of said chamber assembly and said work surface; and

(d) means for removing said decontaminant fluid from said device.

4,876,774

METHOD FOR PREPARING HEAT SET FABRICS

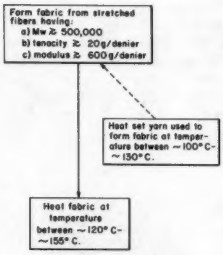
Sheldon Kavesh; Dusan C. Prevorsek, and Gary A. Harpell, all of Morris County, Morris Township, N.J., assignors to Allied-Signal Inc., Morris Township, Morris County, N.J.

Continuation-in-part of Ser. No. 429,942, Sep. 30, 1982. This application Sep. 1, 1983, Ser. No. 527,701
Int. Cl.[4] D04B *1/16, 21/16;* D03D *15/00;* D06C *7/02*
U.S. Cl. 28—166 **14 Claims**

1. A method for preparing heat-set fabrics which comprises the steps:

(a) forming a fabric from stretched fibers of tenacity at least about 20 g/denier and tensile modulus at least about 600 g/denier containing polyethylene of weight average molecular weight at least about 500,000, and

(b) heating the fabric under an applied stress or strain at a temperature between about 120° C. and 155° C. sufficient


Form fabric from stretched fibers having:
a) Mw ≥ 500,000
b) tenacity ≥ 20g/denier
c) modulus ≥ 600g/denier
Heat set yarn used to form fabric at temperature between ~100° C.-~130° C.
Heat fabric at temperature between ~120° C.-~155° C.

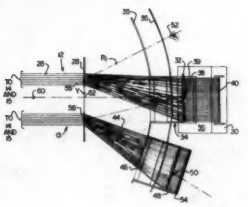
and for at time sufficint to set the fabric in a shape assumed under the applied stress or strain.

4,876,775

YARN SHEET TRANSFER SYSTEM

Joseph A. Steele, Greensboro, and Kenneth A. Byrd, Aberdeen, both of N.C., assignors to Burlington Industries, Inc., Greensboro, N.C.

Filed Jan. 18, 1988, Ser. No. 145,532
Int. Cl.[4] D02H *5/00*
U.S. Cl. 28—190 **19 Claims**



1. An apparatus for forming a warp beam, comprising:

(a) first stationary warp yarn supply means for supplying a plurality of warp yarns from yarn packages;

(b) second stationary warp yarn supply means for supplying a plurality of warp yarns from yarn packages;

(c) means for winding warp yarns onto a spool to form a warp beam; and

(d) warp yarn transfer means located between said first and second warp yarn supply means and said means for winding for supplying warp yarns to said means for winding, said transfer means being selectively engagable between either of said first and second supply means and said means for winding to permit yarn to be wound onto the spool from the yarn packages on the selected supply means,

wherein said warp yarn transfer means includes as transfer device operatively associated with each of said warp yarn supply means and movable between an operable position and an inoperable position with respect to said winding means and the associated warp supply means.

4,876,776

METHOD OF MAKING PIEZOELECTRIC COMPOSITES

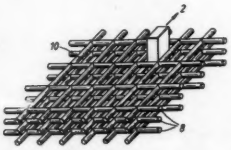
Roger W. Whatmore, Bletchley; Andrew G. Munns, Northampton, and David W. Lane, Wiltshire, all of England, assignors to Plessey Overseas Limited, Ilford, England

Continuation of Ser. No. 804,565, Dec. 4, 1985, abandoned. This application Feb. 11, 1988, Ser. No. 109,358

Claims priority, application United Kingdom, Dec. 15, 1984, 8431718

Int. Cl.[4] H01L *41/22*

U.S. Cl. 29—25.35 3 Claims



1. A method of fabricating a piezoelectric composite comprising an array of piezoelectric elements and a reinforcement structure embedded in a matrix material, wherein the improvement lies in that the method comprises forming the reinforcement structure, prior to assembly with the piezoelectric elements, as a reinforcement cage by weaving a strand of reinforcing fibrous material into a multi-layered cage-like structure defining an array of holes therethrough for receiving and supporting the piezoelectric elements during the fabrication of the piezoelectric composite, inserting the piezoelectric elements into the array of holes through the reinforcement cage and casting the matrix material around the resulting structure to form the piezoelectric composite.

4,876,777

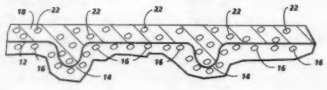
METHOD TO INCREASE HOT OFFSET TEMPERATURE OF SILICONE FUSER

Che C. Chow, Penfield, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed Sep. 2, 1987, Ser. No. 92,343

Int. Cl.[4] B32B *31/00*; G03G *15/00*

U.S. Cl. 29—132 1 Claim



1. A method of fabricating a fuser member for roll fusing apparatus used in fixing toner images to support sheets, the fuser member having a core, comprising the steps of:

securing a generally cylindrical metal oxide embedded member made of rubber around the core, grinding the cylindrical member to suitable size, the cylindrical member having an outer surface, the outer surface having a plurality of holes, a portion of the holes being in the 30–200 micron diameter range, and

coating the outer surface with a layer of RTV silicone impregnated with metal oxide conductive particles, the conductive particles being evenly distributed throughout the elastomer, the layer of elastomer filling said holes in the 30–200 micron diameter range.

4,876,778

METHOD OF MANUFACTURING A MOTORCYCLE RADIATOR

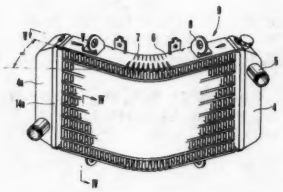
Hisao Hagihara; Takayuki Banno; Shigenori Miya, and Norio Tanaka, all of Yokaichishi, Japan, assignors to Toyo Radiator Co., Ltd., Tokyo, Japan

Filed Mar. 15, 1988, Ser. No. 168,769

Claims priority, application Japan, Mar. 30, 1987, 62-47883[U]

Int. Cl.[4] B21D *53/02*

U.S. Cl. 29—157.3 A 12 Claims



1. A method of manufacturing a motorcycle radiator comprising the steps of:

(i) preparing, (a) a straight radiator core constructed of a plurality of corrugated sheets spaced alternately with a plurality of flattened tubes, said corrugated sheets constituting air fins for heat-exchange use, and said flattened tubes constituting water tubes through which cooling water passes, (b) a pair of elongated water tanks having a plurality of holes and disposed in positions horizontally adjacent to opposite end openings of said flattened tubes so as to communicate with said flattened tubes through said holes and said openings, and (c) a pair of metallic reinforcing plates having an elongated straight shape, between which said straight radiator core is sandwiched, each of said reinforcing plates being provided with a plurality of slits formed at opposite longitudinal edge portions of each of said plates, each of said slits extending in a direction perpendicular to a longitudinal axis of each of said reinforcing plates, said slits on one of said opposite longitudinal edge portions being disposed in a row and at a predetermined pitch, and said slits on the other of said opposite longitudinal edge portions being disposed in another row and at said predetermined pitch at respective positions halfway between positions of adjacent ones of said slits on said one of said edge portions with respect to a direction parallel to said longitudinal axis;

(ii) brazing, joints between said corrugated sheets and said flattened tubes, and joints between said corrugated sheets and said reinforcing plates, so that these components are fixedly assembled to form a straight radiator assembly whereby said opposite end openings of said flattened tubes join with said water tanks in a watertight manner; and

(iii) bending said straight radiator assembly by a predetermined amount in a plane parallel to said longitudinal axis of said reinforcing plates.

4,876,779

APPARATUS AND METHOD FOR MANUFACTURING PLATE FIN COILS OF DIFFERENT CONFIGURATIONS

Kenneth P. Gray, Syracuse, N.Y., assignor to Carrier Corporation, Syracuse, N.Y.

Filed Nov. 6, 1987, Ser. No. 118,380

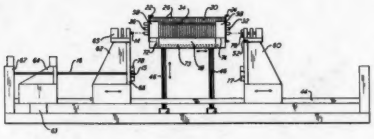
Int. Cl.[4] B21D *53/02*

U.S. Cl. 29—157.3 R 7 Claims

1. A method of belling and expanding a partially assembled multi-row plate fin heat exchanger having a plurality of sheets of plate fins and at least one tube sheet laced with a plurality of tubes having front and back ends which comprises the steps of:

indexing the partially assembled plate fin heat exchanger in a belling station on a vertically movable dimensionally adjustable platform;

setting the length and width dimensions of said vertically movable dimensionally adjustable platform to generally conform with the size of the partially assembled plate fin heat exchanger and adjusting a side clamp means to the width of the partially assembled plate fin heat exchanger for clamping the sides of the heat exchanger with the tube sheet extending beyond the dimensions of said platform;



belling the open ends of the partially assembled multi-row heat exchanger one row at a time;

moving said platform with the belled heat exchanger vertically to an expansion station; and

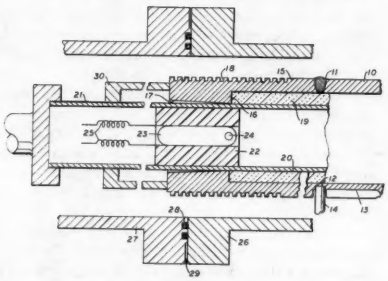
selecting appropriate expanding rods for the heat exchanger configuration and expanding the tubes of the partially assembled multi-row heat exchanger into the plate fins one row at a time.

4,876,780

DOUBLE WALL VACUUM TUBING AND METHOD OF MANUFACTURE

Charles R. Stahl, Scotia, N.Y.; Michael A. Gibson, and Christian W. Knudsen, both of Houston, Tex., assignors to Carbotek, Inc., Houston, Tex.

Filed Oct. 31, 1988, Ser. No. 264,351
Int. Cl.[4] B23P *15/00*
U.S. Cl. 29—157.4 **35 Claims**



1. A method of producing evacuated, double wall pipe for use in transporting hot or cold fluids which comprises

providing a first pipe of predetermined larger diameter and a second pipe having an O.D. substantially smaller than the I.D. of the first pipe,

forming an evacuation opening in said first pipe,

inserting said second pipe inside said first pipe with an annular space therebetween,

welding said pipes together at one end,

securing a stretching tool to the other end of said second pipe,

prestressing said second pipe mechanically with said stretching tool an amount sufficient to prevent substantial buckling of said second pipe when said double wall pipe is used at elevated temperatures,

welding the other end of said first pipe and said prestressed second pipe together without the introduction of mechanical spacers between the pipes,

evacuating the annulus between said pipes through said evacuation opening, and

sealing said evacuation opening.

4,876,781

METHOD OF MAKING A GARTER-TYPE AXIALLY RESILIENT COILED SPRING

Peter J. Balsells, P.O. Box 15092, Santa Ana, Calif. 92705, assignor to Peter J. Balsells, Santa Ana, Calif. and Joan C. Balsells

Division of Ser. No. 186,018, Apr. 25, 1988, Pat. No. 4,826,144.
This application Nov. 7, 1988, Ser. No. 268,217
Int. Cl.[4] B21F *37/02, 3/12*
U.S. Cl. 29—173 **6 Claims**

1. A method for making a garter-type axially resilient coiled spring comprising the steps of:

fabricating by winding a metallic wire to produce coils canted with respect to a centerline of the garter-type axially resilient coiled spring, each coil having a leading portion and a trailing portion, said leading portion being disposed at a front angle in a range from 0 to 35 degrees with respect to a line normal to a centerline of the garter-type axially resilient coiled spring and said trailing portion being disposed at a back angle to the normal line;

during fabricating of the wire-adjusting the magnitude of the back angle in order to achieve a preselected resiliency of the garter-type axially resilient coiled spring; and

attaching two ends of the wound wire by welding in a manner that form forming a garter-type axially resilient coiled spring having the trailing portion along the inside diameter of the garter-type axially resilient coiled spring and the leading portion along the outside diameter of the garter-type axially resilient coiled spring.

4,876,782

APPARATUS FOR ATTACHING A GLIDE TO A CHAIR LEG

Ralph Carpinella, Middlebury, and Karl Becher, New Preston, both of Conn., assignors to Carpin Manufacturing, Inc., Waterbury, Conn.

Filed Aug. 17, 1988, Ser. No. 233,332
Int. Cl.[4] B23P *19/04*
U.S. Cl. 29—234 **18 Claims**

1. Apparatus for driving a glide into the free end of a chair leg that has a longitudinal axis, comprising:

means for holding a supply of glides, each glide being adapted to fit loosely on the free end of the leg in a first position and to be driven tightly onto the leg in a second position;

fixture means for engaging the leg remote from the free end of the leg, to support the leg against longitudinal displacement;

drive means mounted in fixed relation to the fixture means and in spaced relation to the free end of the leg, the drive means including means for selectively advancing and withdrawing a ram along a ram axis toward and away from the leg over a known stroke distance;

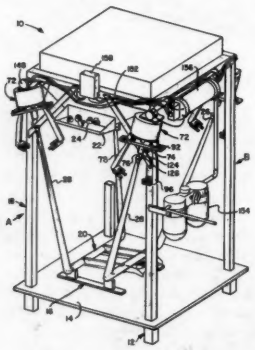
a pair of cam arms pivotally connected at one end to said drive means independently of the ram, for movement along arcuate paths transverse to the ram axis, each arm

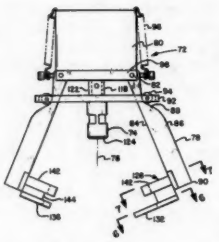
having a free end and a portion defining a cam profile between the pivoted and free ends;

cam follower means connected to move with the ram and engaging the cam profiles, for controlling the arcuate movement of the cam arms such that when the ram is advanced the arm free ends pivot toward each other; and

jaw means carried by the respective free ends of the pair of cam arms and oriented toward each other, for engaging the leg near the free end thereof as the ram advances, whereby the jaw means cooperate to align the leg axis with the ram axis while the glide is in the first position and to support the leg transversely to the leg axis as the ram advances along the known stroke distance to drive the glide into the second position.

12. Apparatus for driving a ram along a ram axis toward a work piece supported in a stationary position and having a work piece axis, comprising:





drive means adapted to be mounted in fixed, spaced relation to the work piece, for selectively advancing and withdrawing the ram over a stroke distance along the ram axis;

a pair of cam arms pivotally connected at one end to said drive means independently of the ram, each arm having a free end for movement along an arcuate path transverse to the ram axis, and a side portion defining a cam profile;

cam follower means connected to move with the ram and engaging the profiles of the cam arms, for controlling the arcuate movement of the cam arms such that when the ram is advanced the arms pivot toward the ram axis; and

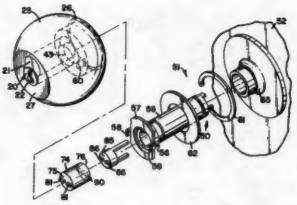
jaw means carried by the respective free ends of the cam arms and oriented toward each other, for engaging respective portions of the work piece as the ram advances, whereby the jaw means cooperate to align the axis of the work piece with the ram axis and to support the work piece as the ram advances over the stroke distance toward the work piece.

4,876,783

METHOD AND APPARATUS FOR CONVERSION OF DOORKNOB LOCK SETS

Neil P. Campion, Edina; Michael J. Foty, Bloomington, and Richard P. Novak, Minneapolis, all of Minn., assignors to Progressive Security Products, Inc., Edina, Minn.

Filed Jun. 19, 1987, Ser. No. 64,805
Int. Cl.[4] E05B *15/00*
U.S. Cl. 29—401.1 **21 Claims**



1. A method of converting a lock set having a first lock cylinder to one having a different alternate lock cylinder therein; said method including the steps of:

(a) providing a lock set having a first lock cylinder, a spindle, and a driver mechanism to be converted; and, removing the first lock cylinder therefrom;

(b) providing a universal knob for mounting on a variety of lock sets of a variety of designs; said universal knob having an outer edge portion, an inner edge portion and an internal bore;

(i) said bore defining a mounting chamber extending inwardly from said inner edge portion and including mounting means;

(ii) said universal knob including means for operatively mounting a lock cylinder mechanism therein;

(c) providing a lock cylinder mechanism having a rotatable alternate lock cylinder with a first end and a second end;

(i) said rotatable alternate cylinder first end including a key slot therein;

(ii) said rotatable alternate cylinder second end including a tail piece engagement mechanism thereon;

(d) providing a tail piece member selectively engageable by said rotatable alternate lock cylinder second end, to be rotated thereby; said tail piece member including means for selectively engaging and operating a driver mechanism of the lock set to be converted;

(e) providing a spindle adaptor selectively mountable on a lock spindle of the lock set; said spindle adaptor including a mounting flange receivable within said universal knob bore;

(i) said spindle adaptor mounting flange including first and second mounting ears projecting outwardly therefrom;

(ii) said universal knob bore defining an inner mounting face having first and second oppositely positioned mounting recesses therein, said mounting recesses being oriented for receipt of said mounting ears therein;

(f) mounting said spindle adaptor on the spindle of the lock set;

(g) mounting the universal knob on the spindle adaptor with said spindle adaptor ears received within said knob bore mounting recesses; and,

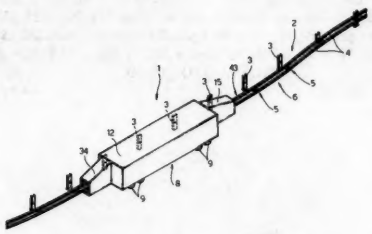
(h) mounting said lock cylinder mechanism in said universal knob with said tail piece member in engagement with, and in extension between, said rotatable alternate cylinder and the driver mechanism to transmit rotational motion therebetween.

4,876,784

METHOD FOR ON-SITE MAINTENANCE OF GUARDRAILS

Romolo Bussolino, Castiglione d'Asti, Italy, assignor to Hastasider Metal S.R.L., Asti, Italy

Filed Jul. 21, 1988, Ser. No. 222,264
Claims priority, application Italy, Jul. 24, 1987, 67655 A/87; Mar. 18, 1988, 52985/88[U]
Int. Cl.[4] B23P 6/00; E01B 27/06; B61B 13/04
U.S. Cl. 29—402.06 9 Claims



1. A method for on-site maintenance of guardrails consisting of a number of posts; a number of metal section segments; a number of first joints connecting the said segments into a continuous strip; and a number of second joints connecting the said continuous strip to the said posts; said method comprising the steps of:

starting at a first portion of said guardrail;

successively dismantling the said second joints on the said first portion;

moving along the said first portion a mobile, continuous maintenance apparatus by which unprocessed segments on the said first portion are engaged as they are detached from the respective said posts by dismantling the respective said second joints, the said apparatus presenting a processing tunnel with an input for the unprocessed segments and an output for processed segments processed in said apparatus;

reconnecting said processed segments to said posts by reforming said second joints as said processed segments come out of said output, thus defining a bend moving with said apparatus along the guardrail, and consisting of a number of adjacent segments supported on said apparatus and connected by respective said first joints into a continuous strip.

4,876,785

METHOD FOR INSTALLING AND REMOVING A FIREPLACE INSERT

Roberts H. Driggers, 302 Covewood Tr., Asheville, N.C. 28805

Filed Aug. 25, 1987, Ser. No. 89,235
Int. Cl.[4] B23P 19/04
U.S. Cl. 29—426.3 3 Claims

1. A process for initially installing a fireplace insert into a hearth cavity, said process including steps for the subsequent removal and reinsertion of said fireplace insert for the purpose of cleaning said cavity and its associated chimney, comprising the steps of:

positioning an apparatus for moving said fireplace insert to the proximity of said hearth cavity, said apparatus comprising:

a roller device having a vertically movable topmost pair of parallel rails and a stationary bottommost pair of parallel rails, each with a proximal end and a distal end;

said bottommost pair of parallel rails having wheels appropriately positioned for moving said device along the ground or floor;

said roller device also having a vertical member joining and bracing said parts of parallel rails at said proximal ends;

an adjustable vertical support means for said topmost pair of parallel rails comprising a pulley system;

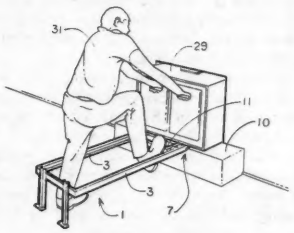
said topmost rails each having a roller at said distal end;

said topmost rails attached and supported by a bar at said proximal end and a bar near said distal end;

a track disposed along the inward side of said topmost rails; and

a tray with wheels for moving along said tracks, said tray also including rollers for conveying said insert onto said tray;

adjusting said vertical support means to conform the height of said topmost parallel rails to a lower surface of said fireplace insert;



elevating the lower surface of said insert;

positioning said distal end of said rails under said insert;

rolling said tray along said tracks toward said distal end of said rails;

loading said insert onto said tray;

rolling said tray to said proximal end of said rails;

moving roller device to proximity of said hearth cavity;

adjusting said vertical support means to conform the height of said topmost rails to the height of a hearth adjacent said hearth cavity; and

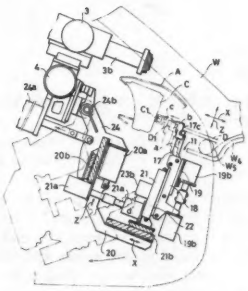
conveying said insert to said hearth cavity.

4,876,786

METHOD AND APPARATUS FOR ASSEMBLING AN INSTRUMENT PANEL IN AN AUTOMOBILE

Yasuhiro Yamamoto; Teiji Miwa, both of Sayama, and Tadashi Ajima, Kameyama, all of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Nov. 30, 1988, Ser. No. 278,122
Claims priority, application Japan, Dec. 1, 1987, 62-301418; Dec. 1, 1987, 62-301419
Int. Cl.[4] B23P 11/00, 21/00
U.S. Cl. 29—429 3 Claims



1. A method of assembling an automobile instrument panel

in which the instrument panel is mounted in the front part of a cabin of a car body, said method comprising the steps of;

clamping an instrument panel set on a setting jig by applying clamp means on both longitudinal ends of the panel so as to hold the panel on an assembly jig, the clamp means being provided on both ends of the assembly jig which is mounted on a robot arm;

operating the robot arm to insert the assembly jig into the car cabin through a door opening in the car body;

moving the assembly jig to predetermined assembly position so that end walls located at the longitudinal ends of the instrument panel overlap the outer side surfaces of brackets, each bracket being pre-installed on each side, widthwise of the car, of the front part of the car cabin;

setting in advance at a predetermined position in the front part of the car cabin a cable that is to be connected to a cable connector attached to a built-in component incorporated in the instrument panel;

setting an X-axis, one of the coordinate axes of the stationary coordinates for the assembly jig, so that it is aligned with the longitudinal axis of the cable connector when the instrument panel is held on the assembly jig;

clamping the cable set at the predetermined position by a cable holder means when the assembly jig is moved to a position before the assembly position, the cable holder means being provided on the assembly jig so as to be movable in the X-axis direction; and

moving the cable holder means in the X-axis direction to connect the cable to the cable connector.

4,876,787

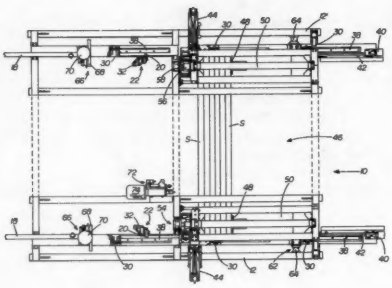
APPARATUS AND METHOD FOR FRAME WALL FABRICATION

Jeffrey L. Ditty, P.O. Box 55128, Lexington, Ky. 40555; Robert L. Rives, Lexington, Ky.; James T. Schanding, Paris, Ky., and Eric S. Burka, Lexington, Ky., assignors to Jeffrey L. Ditty and Versa Tech Engineering, both of Lexington, Ky.

Filed Jun. 20, 1988, Ser. No. 208,686

Int. Cl.[4] B27F *7/00*

U.S. Cl. 29—430 **15 Claims**



1. A method for fabricating a frame wall with a framing apparatus, comprising the steps of:

feeding first and second end plates into registration position;

positioning a first stud in registration position between said end plates;

tacking said first stud in registration position while maintaining clearance between said end plates for positioning of a second stud in registration between said end plates; and

staking and anchoring said end plates and first stud fully together only after said second stud is in registration; whereby the necessary clearance is provided between said end plates to allow proper and efficient positioning of said second stud while application of pressure tending to pull said end plates and first stud apart in order to position said second stud in registration is substantially eliminated.

4,876,788

METHOD OF MAKING A LEAKPROOF CONNECTION ABOUT THE OUTLET TUBE OF A LIQUID CONTAINMENT BAG

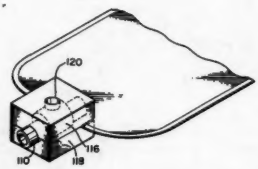
Peter L. Steer, and Graham E. Steer, both of North Reigate, England, assignors to E. R. Squibb and Sons, Inc., Princeton, N.J.

Continuation-in-part of Ser. No. 123,428, Nov. 20, 1987, abandoned. This application Jul. 6, 1988, Ser. No. 215,835

Claims priority, application United Kingdom, Nov. 28, 1986, 86 28480; Nov. 28, 1986, 86 28481; Jul. 8, 1987, 87 16089

Int. Cl.[4] B21K *25/00*

U.S. Cl. 29—508 **4 Claims**



1. A method of making a bag for containing liquids and having an outlet tube comprising a first step of placing the tube between two superposed bag walls, and by a subsequent step of sliding an encircling sleeve over the tube to a position where it contains within it the portions of the bag walls on either side of the tube, and thirdly, compressing the sleeve onto the tube by a crimping operation in which the lines of action of the crimping forces are perpendicular to a first plane which is substantially perpendicular to the plane containing the walls of the bag, said first plane also containing the longitudinal axis of the tube.

4,876,789

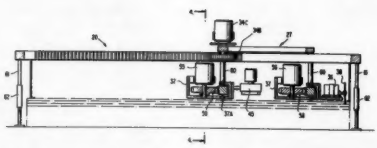
APPARATUS FOR MEASURING AND CUTTING SHEETROCK

Joseph M. Burwell, 7202 Fairchild Dr., Fairfax, Va. 22306

Continuation-in-part of Ser. No. 185,689, Apr. 22, 1988. This application Aug. 26, 1988, Ser. No. 236,881

Int. Cl.[4] B23P *23/00*; G01B *5/20*

U.S. Cl. 29—560 **8 Claims**



1. An apparatus for simultaneously measuring the walls and ceilings of an area to be paneled with sheetrock and cutting 4×8 panels of sheetrock for installation comprising, a measuring unit having a stylus supported thereon for both vertical and horizontal movement to trace out the outline of a panel of sheetrock to be cut directly from the wall upon which the panel is to be installed, a cutting unit having sawing means mounted thereon for both vertical and horizontal movement positionable over a stack of 4×8 sheetrock panels and including drive means for said sawing means and electrical control means connected between said measuring unit and said sawing means drive means to direct said sawing means of said cutting unit to cut panels of sheetrock as outlined by the measuring

stylus of said measuring unit simultaneously with the path traced by the measuring stylus on said measuring unit, said measuring unit comprising a pair of U-shaped frames connected at the top inner ends of said U-shape by a cross member having a universal pivot for swing mounting said U-shaped frames of the measuring unit to a wheeled floor carrier for either vertical or horizontal movement to measure directly from either wall or ceiling to direct the sawing means of the cutting means to follow the pattern outlined by the stylus of said measuring means, sleeves carried by the outer free ends of said U-shaped frames having external gear teeth on each sleeve to permit driving of the secondary rectangular frame therealong, and a secondary rectangular frame being mounted with its major axis transverse to the vertical axis of the U-shaped frames of the measuring unit on which said stylus is carried.

4,876,790

MAGNETIC INFORMATION RECORDING AND/OR READING HEAD WITH INCREASED WEAR-RESISTANT PROPERTIES AND A METHOD FOR MANUFACTURING THE SAME

Istvan Grimm; Sandor Stenczinger; Istvan Bolla, all of Budapest, and Istvan Csanyi, Dunakeszi, all of Hungary, assignors to Budapesti Radiotechnikai Gyar, Budapest, Hungary

PCT No. PCT/HU84/00053, § 371 Date Sep. 5, 1985, § 102(e) Date Sep. 5, 1985, PCT Pub. No. WO85/02289, PCT Pub. Date May 23, 1985

Continuation of Ser. No. 770,863, Jul. 11, 1985, abandoned. This PCT application Nov. 9, 1984, Ser. No. 170,681

Claims priority, application Hungary, Nov. 11, 1983, 3862/83

Int. Cl.[4] G11B *5/42*

U.S. Cl. 29—603 **9 Claims**

1. A method for producing magnetic recording and/or playback heads with improved abrasion resistance for use with a magnetic record medium having a magnetizable surface for retaining information in the form of a pattern of magnetization, comprising the steps of:

(a) providing pole sheets of predetermined shape made of a material with high magnetic permeability, each sheet having a frontal zone for sliding engagement with said recording medium and a lateral surface substantially normal to said frontal zone for defining a side of a pole gap;

(b) providing a hard layer on at least one surface of said sheets extends to said frontal zone by means of high rate reactive cathode sputtering, said layer having a substantially uniform thickness in the range of 0.5 to 2.0 micrometer, having a Vickers hardness corresponding to the hardness exhibited by titanium nitride, chromium nitride, silicon carbide, tantalum nitride or tungsten nitride and being of an electrically non-conductive and non-magnetizable material;

(c) assembling said sheets together to form a pair of half cores in such a way that in each of said half cores said sheets are stacked on each other and at least one of said layers 12 arranged between each pair of sheets in each half core; and

(d) mounting said half cores together to form said head.

4,876,791

APPARATUS FOR AND METHODS OF DIE BONDING

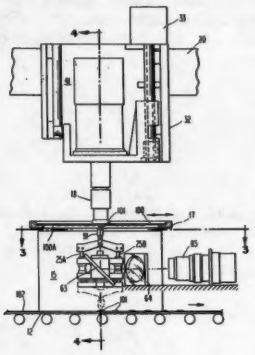
Gerard H. Michaud, Furlong; James H. Graham, Pottstown, both of Pa., and Roger P. Stout, Chandler, Ariz., assignors to Kulicke & Soffa Industries, Inc., Willow Grove, Pa.

Continuation of Ser. No. 855,009, Apr. 22, 1986, abandoned.

This application Mar. 21, 1988, Ser. No. 170,825

Int. Cl.[4] H05K *13/04*

U.S. Cl. 29—840 **54 Claims**



1. An apparatus for removing a die from a flexible adhesive film mounted wafer containing a plurality of dice and bonding the die to a bond site on a substrate having a plurality of bond sites thereon, said apparatus comprising:

(a) component holding means, including an XY table for holding the dice side of said wafer upside down in a first substantially horizontal plane, said XY table being movable such that each die is locatable at a pickup location within said first plane;

(b) a die eject pin above said wafer, including means for actuating said pin towards the film side of the wafer;

(c) substrate holding means, including a substrate track for holding the substrate in a second substantially horizontal plane below said first plane, said substrate track being movable such that each of the bond sites is locatable at a bond location and aligned below said pickup location; and

(d) a die bond head rotatably located between said first and second planes, including means for actuating said die bond head for removing the die from the flexible adhesive film and for placing the die on the substrate.

4,876,792

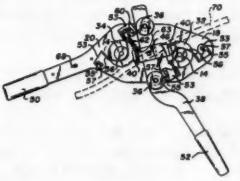
CABLE STRIPPING DEVICE

Lin Black, SS #3, Site 13, Comp 39, Prince George, B. C., Canada (V2N 2S7)

Filed Dec. 6, 1988, Ser. No. 280,448

Int. Cl.[4] B21F *13/00*; B26B *27/00*

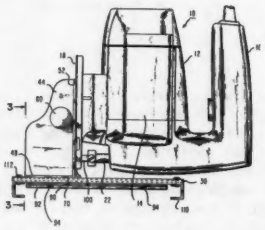
U.S. Cl. 30—90.9 **9 Claims**



1. A cable stripping device for removing armour from an armoured cable, comprising

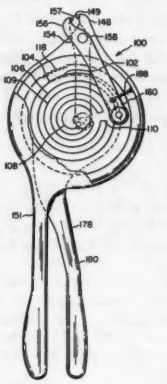
a pair of rotatable cutter members;
cutter support means for supporting said cutter members for rotation about parallel axes of rotation and in a common plane;
said cutter members being spaced apart to receive said cable therebetween;
cable guide means for guiding said cable between said cutter members; and
means for displacing said cable guide means against opposite sides of said cable to thereby press opposite sides of said cable against said cutter members, whereby said cutter members make longitudinal cuts along opposite sides of said cable.

4,876,793
JAMB SAW
James A. Quaglia, 88C Friendship Rd., Howell, N.J. 07731
Filed Jun. 27, 1988, Ser. No. 212,248
Int. Cl.[4] B27B *11/02*
U.S. Cl. 30—122 **9 Claims**



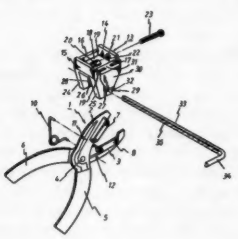
1. A portable, power-driven, horizontally reciprocating saw utilizing a standard jig saw having a reciprocating means, a skid plate and a motor means, said jig saw positioned such that said reciprocating means is positioned to reciprocate in a horizontal plane, comprising:
an upper assembly plate having longitudinal edges and transverse ends, said upper assembly plate having two upstanding mounting brackets perpendicularly secured to said upper assembly plate, said upper assembly plate having a U-shaped slot positioned between said brackets, said upper assembly plate having said longitudinal edges thereof curved under to define a channel between said transverse ends;
a lower assembly plate slidably receivable in said channel of said upper assembly plate, said lower assembly plate having a drive post secured thereto, said drive post slidably receivable in said U-shaped slot of said upper assembly plate when said lower assembly plate is slidably received in said channel of said upper assembly plate;
a saw plate having a mounting portion and at least one longitudinally extending saw blade portion;
a means for mounting said saw plate to said lower assembly plate;
a plurality of shoe plates secured to said transverse ends of said upper assembly plate to adjust the height of said saw blades;
a drive pin having a first end secured to said reciprocating means of said jig saw and having a second end secured to a drive block removably secured to said drive post on said lower assembly plate for transmitting said horizontal reciprocating action of said jig saw to said lower assembly plate and to said saw blade.

4,876,794
VARIABLE MECHANICAL ADVANTAGE DEVICE UTILIZING A RADIAL CAM
Herman A. Myers, Hopwood, Pa., assignor to Radia-Cam Inc., Hopwood, Pa.
Filed Jul. 13, 1988, Ser. No. 218,813
Int. Cl.[4] B26B *13/00*
U.S. Cl. 30—252 **49 Claims**



1. A cam comprising a flat plate having at least a first flat surface and having a spiral groove in the first flat surface, the spiral groove formed of a plurality of tracks having progressively smaller radii and including at least an innermost track and an outermost track, the cam further including a return slot connecting the innermost track to the outermost track, with the tracks and return slot forming a continuous groove on the first flat surface.

4,876,795
CUTTER, IN PARTICULAR FOR A SLAT, ESPECIALLY OF A VENETIAN BLIND
Huang Chun-cheng, Taipei, Taiwan, assignor to Teh Yor Industrial Co., Ltd., Taiwan
Filed Jul. 28, 1988, Ser. No. 225,269
Int. Cl.[4] B26B *13/10*
U.S. Cl. 30—254 **8 Claims**



1. A cutter, in particular for a slat, especially of a venetian blind, comprising a pair of scissors with extended handles and joined at a center fulcrum, said scissors being partially deflected at a portion of an inner part thereof to form a pair of knife blades deviated from and substantially parallel to the plane of its respective scissor, a guide block having opposite higher lateral guide walls and opposite lower side walls, which all together define a recess, and a connector attached to one of

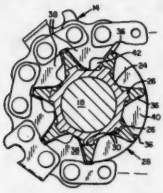
said side walls at a central upper portion thereof to form a spacing between an inner surface of said connector and an outer surface of said one side wall for engaging with one of said scissors.

4,876,796

SPROCKET ASSEMBLY FOR CHAIN SAWS

Eugene E. Calkins, Salem, and Michael V. Petrovich, Portland, both of Oreg., assignors to Blount, Inc., Portland, Oreg.

Filed Mar. 18, 1988, Ser. No. 169,899
Int. Cl.[4] B23D *57/02*
U.S. Cl. 30—383 **6 Claims**



1. A sprocket assembly for a chain saw comprising; a sprocket and a sprocket adapter, said sprocket provided with rims and multiple sprocket teeth confined between the rims and forming therewith tang receiving pockets having open pocket bottoms, said sprocket adapter including an adapter shaft having a circular center opening adapted to receive the drive shaft of a chain saw power head and a determined outer configuration including outwardly projected splines having spline roots, said adapter shaft having a radial thickness adjacent the roots of the splines that is a determined thickness for strength and said configuration of the adapter shaft being characterized by relieved areas of thickness between the splines, said relieved areas of thickness including a minimum thickness at the center position between the splines and having progressively greater thicknesses progressing toward the spline roots, said sprocket having spline-receiving grooves positioned for receiving the splines of the adapter shaft whereby the open pocket bottoms between the teeth are positioned over the center position of the relieved areas of thickness between the spline roots upon assembly of the sprocket and sprocket adapter.

4,876,797

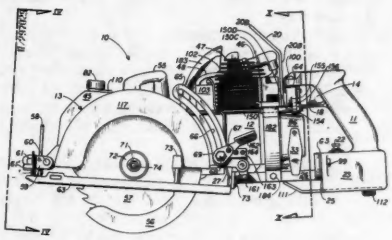
REDUCED VIBRATION PORTABLE GAS OPERATED HAND SAW

Alvaro Zapata, 7511 Maldive St., Rio Linda, Calif. 95673

Filed Jan. 17, 1989, Ser. No. 297,029
Int. Cl.[4] B23D *45/16*; B25F *3/00*; B26B *11/00*
U.S. Cl. 30—388 **16 Claims**

1. In a self contained gas operated portable hand saw including

a engine housing having a gas operated engine mounted therein and a engine shaft extending out of said housing driven by said engine, a carburetor mounted in said housing coupled to said engine, a handle mounted at one end spaced from said engine housing and a saw blade housing adapted to house therein a circular saw blade mounted at the other end of said engine housing, said saw housing being fixedly secured to and extending linearly from said engine housing and also having a handle thereon spaced from said first mentioned handle a distant sufficient for an operator to simultaneously grasp both of said handles when said engine is running and said engine shaft is rotating, a trigger provided on said first mentioned handle operatively connected to said carburetor for activating the same, a rotatable saw blade shaft extending transverse to said saw housing adapted to have said saw blade keyed thereto for rotation, a rotatable gear mounted in said saw housing having said rotatable saw blade shaft fixedly secured thereto, said gear rotating in a plane extending normal to the longitudinal axis of said hand saw whereby any saw blade keyed to said rotatable saw blade shaft rotates in a plane extending normal to the longitudinal extent of said hand saw, a worm gear in driving engagement with said saw blade shaft fixedly secured to a worm gear shaft extending toward said engine shaft, and centrifugal clutch means mounted in a clutch housing coupled to said engine housing between said worm gear shaft and said



engine shaft driven by said engine shaft and engageable with said worm gear shaft when activated to thereby rotate said worm gear to rotate said blade shaft gear thereby rotating any saw blade keyed to said rotatable saw blade shaft, the improvement which comprises:

said engine being suspended within said engine housing by vibration dampening means whereby said engine can vibrate freely with respect to said engine housing, and

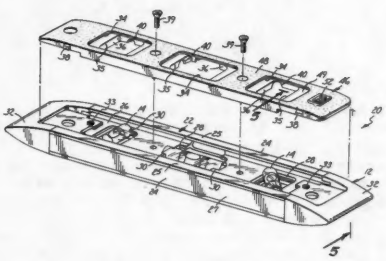
vibration isolating means coupled to both said first-mentioned handle and said engine housing for isolating vibration between said engine and said handle, and said saw blade housing.

4,876,798

LEVEL WITH ILLUMINATED BUBBLE VIALS

Harold Zimmerman, 2606 Mercury Ln., Bismarck, N. Dak. 58501

Filed Jan. 11, 1988, Ser. No. 142,649
Int. Cl.[4] G01C *9/32*
U.S. Cl. 33—348.2 **4 Claims**



1. A retrofit assembly for converting an unlighted level to an illuminated level, the unlighted level including:

an elongate main frame provided with two parallel, spaced-apart longitudinally extending flat, plane working surfaces and a web extending between said working surfaces generally in parallel relation to the longitudinal axes of the working surfaces and at right angles to the plane of the

working surfaces, said web being provided with a plurality of frame sight ports therethrough;

a plurality of bubble vials each positioned in the main frame across and slightly beyond one of the frame sight ports to have a permanent fixed angular relationship with respect to the plane of the main frame working surfaces, and

first and second side plates positioned in parallel relation to each other to cover at least a substantial portion of the main frame web, with one of said side plates being positioned on each side of the main frame, said side plates each being provided with a plurality of side plate sight ports in visual alignment with each of the main frame sight ports, and

fastening means to removably position the first side plate to the main frame;

said retrofit assembly including:

(a) a retrofit side plate of configuration and character to effectively replace said first side plate when said first side plate has been removed, said retrofit side plate having a plurality of side plate sight ports therethrough positioned to be in visual alignment with the main frame sight ports;

(b) a plurality of light emitting diodes each mounted on a side of the retrofit side plate adjacent the main frame web to have position to emit light on end portions of said bubble vials, each such diode being in spaced, adjacent relation to and outside of a bubble vial;

(c) a switch mounted to the retrofit side plate in position to be activated by an operator;

(d) battery means mounted to a side of the retrofit side plate adjacent the web; and

(e) electrical conductors mounted to a side of the retrofit side plate adjacent the web, said conductors coupling the light emitting diodes, the battery means and the switch to cause energization of the light emitting diodes when the switch is actuated.

4,876,799

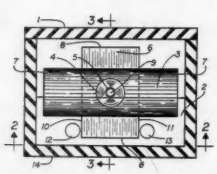
LEVEL SENSING UNIT AND A LEVEL INDICATING DEVICE THEREON

Kenneth E. Wolf, 995 Sheridan, Wauconda, Ill. 60084

Filed Aug. 3, 1988, Ser. No. 227,696

Int. Cl.[4] C01C *9/06*; B60Q *1/52*

U.S. Cl. 33—366 **4 Claims**



1. A level sensing unit comprising a sealed housing with a front and back wall, a top and bottom and two side walls and containing a fluid reservoir;

an axle with an electrically conductive surface connected to and extending between the front and back walls;

a generally cylindrical float pivotally mounted on the axle via a bushing with an electrically conductive surface located approximately centrally on the float, coincident with a short axis thereof, and in electrical contact with the axle;

said float having a flat electrical conductive plate with a first and second edge intersecting the float along its long axis and placed normal to and in electrical contact with said bushing, said plate extending above the surface of the cylindrical body and placed approximately midway between the ends of the float and disposed symmetrically with respect to said bushing; and

first and second electrically conductive strips mounted between the front and back walls coparallel to the axle and proximate to the first and second edges of said plate.

4,876,800

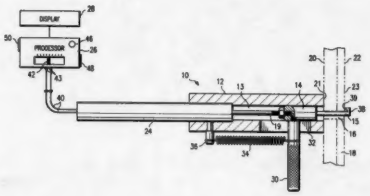
PORTABLE GRIP LENGTH INDICATOR

Gary W. Pekar; Jack W. Mason, both of Grand Prairie, and Michael Blanc, Fort Worth, all of Tex., assignors to LTV Aerospace and Defense Company, Grand Prairie, Tex.

Filed Oct. 7, 1988, Ser. No. 254,978

Int. Cl.[4] G01B *7/06, 7/02*

U.S. Cl. 33—784 **19 Claims**



1. A portable grip length indicator for determining a discrete fastener length for a fastener to be used in fastening the opposite faces of sheet-like material(s), said indicator comprising:

a body;

probe means connected to said body and capable of extension beyond said body for determining the dimension between the opposite faces, said probe means having a distal end that is extendible beyond the body;

transducer means connected to said probe means for sensing the relative movement of the probe means and translating said movement into an electrical output signal; and

electrical processing means for processing the output signal from the transducer means and computing a discrete fastener length according to a predetermined correlation of the dimension between the opposite faces and the type of fastener to be used, said electrical processing means including means for storing information concerning the type of fastener used said correlation being stored and maintained in memory by said processing means.

4,876,801

METHOD AND MEANS FOR DRYING BULK GOODS

Johann Gehring, Spardorf, and Siegfried Birkle, Hoechstadt A/Aisch, both of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Munich, Fed. Rep. of Germany

Filed Mar. 21, 1988, Ser. No. 170,906

Claims priority, application Fed. Rep. of Germany, Apr. 16, 1987, 3713069

Int. Cl.[4] F26B *3/00*

U.S. Cl. 34—9 **9 Claims**

1. A drying device for bulk goods comprising:

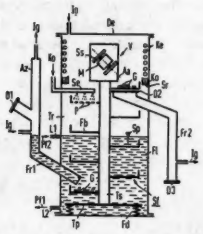
a chamber having a drying space therein,

a vibratory helical conveyor for conveying bulk goods through said drying space,

a body of water-immiscible liquid contained in said drying space, said liquid being lighter than water,

means for rendering said drying space gas-tight,

means for introducing an inert gas into said drying space, and



means for directing moisture displaced by said liquid to the bottom of said chamber for discharge therefrom.

4,876,802

PROCESS AND MEANS FOR THE HEAT TREATMENT OF POWDERY OR GRANULATE MATERIAL

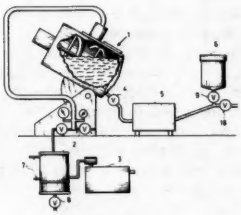
Gerhard Gergely; Irmgard Gergely, and Thomas Gergely, all of A-1050 Vienna, Gartengasse 8, Austria

Continuation-in-part of Ser. No. 766,884, Aug. 16, 1985, abandoned. This application Jun. 23, 1986, Ser. No. 877,112

Claims priority, application Austria, Dec. 21, 1983, 4465/83-1; Switzerland, Jun. 21, 1985, 2640/85; Oct. 3, 1985, 4267/85

Int. Cl.[4] F26B *5/04*

U.S. Cl. 34—15 **18 Claims**



1. In a process for heat treating agitated powder or granulate material contained in a closed drum wherein hot gas is driven through the material, the improvement which comprises the gas comprising a treatment agent and a carrier gas at a temperature sufficient that the treatment agent is present in the vapor state and is drawn through the agitated material, said material being at a temperature below the boiling temperature of the treatment agent and at nearly pressure, and after the desired reaction time, the treatment agent condensed on the material is evaporated and drawn out of the drum by the application of a vacuum at or below the pressure corresponding the boiling point of the treatment agent.

4,876,803

DRYER APPARATUS FOR DRYING A WEB

Gregory L. Wedel, Beloit, Wis., assignor to Beloit Corporation, Beloit, Wis.

Continuation-in-part of Ser. No. 14,569, Feb. 13, 1987. This application Jul. 22, 1988, Ser. No. 223,186

Int. Cl.[4] F26B *11/02*

U.S. Cl. 34—117 **8 Claims**

1. A dryer apparatus for drying a web extending through a dryer section of a paper machine, said apparatus comprising;

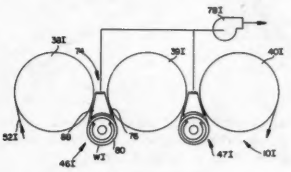
a first dryer of the dryer section;

a dryer felt movably extending around said first dryer such that the web is disposed between said first dryer and said felt for drying the web;

a second dryer disposed downstream relative to said first dryer, the web and said felt extending around said second dryer such that the web is disposed between said second dryer and said felt for further drying of the web;

a vacuum transfer roll disposed downstream relative to said first dryer and upstream relative to said second dryer such that the web and said felt extend around said transfer roll so that said felt is disposed between the web and said transfer roll when the web and said felt move around said transfer roll;

sealing means extending between said first and second dryers for reducing a flow of air between said first and second dryers into a pocket defined by said transfer roll and said felt extending between said dryers and said transfer roll;



said transfer roll including:

a perforate shell, said shell being connected to a source of partial vacuum such that in use of the apparatus, a partial vacuum is generated within said shell, said partial vacuum inducing through said perforate shell a further partial vacuum within said pocket so that air flows in a direction from the web towards said felt for urging the web into close conformity with said felt during movement of the web around said transfer roll and also during movement of the web between said dryers and said transfer roll; and

said sealing means further including:

a wedge-shaped box disposed within and conforming to the shape of said pocket such that said further vacuum is induced within said pocket and externally relative to said box.

4,876,804

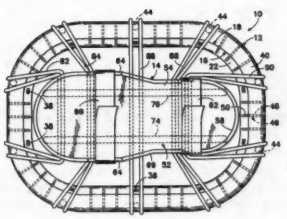
JUMPING SHOE

LeRoy Hart, 9340 NE. 76th St., Vancouver, Wash. 98662

Filed Nov. 22, 1988, Ser. No. 275,397

Int. Cl.[4] A43B *3/10*

U.S. Cl. 36—7.8 **19 Claims**



1. An improved jumping shoe attachment for use with a shoe comprising:

a base having spaced apart top and bottom margins and a rigid, continuous, peripherally extending wall extending between the margins;

a shoe holder for receiving a shoe thereon including straps for holding the shoe to the holder; and

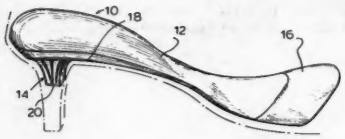
resilient means extending in tension between said base and said shoe holder allowing resilient, returnable vertical movement of said shoe holder relative to said base.

4,876,805

SHOCK ABSORBING DEVICE FOR HIGH HEEL FOOTWEAR

William J. Peoples, Allentown, Pa., assignor to Polymer Dynamics Technology, Inc., Allentown, Pa.

Filed Apr. 29, 1988, Ser. No. 188,907
Int. Cl.[4] A43B *13/40, 13/28, 21/32*
U.S. Cl. 36—43 **11 Claims**



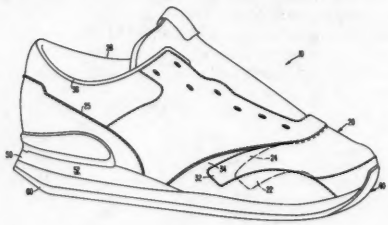
1. The shock absorbing insole of claim 1, further comprises:
an energy absorbing viscoelastic polymer component at the metatarsal portion of the footbed.

4,876,806

ASYMMETRIC SHOE

John R. Robinson, Beaverton, and Daniel J. Richard, Portland, both of Oreg., assignors to Nike, Inc., Beaverton, Oreg.

Continuation of Ser. No. 823,772, Jan. 29, 1986, abandoned. This application Sep. 8, 1988, Ser. No. 243,191
Int. Cl.[4] A43B *5/00, 23/00, 13/12*
U.S. Cl. 36—114 **18 Claims**



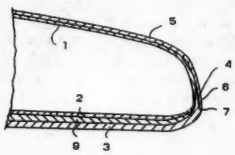
1. An asymmetric shoe having a forepart section and a rearpart section comprising:
an upper;
a sole attached to said upper;
said upper being formed of a plurality of layers of material including an inner layer and an outer layer, said outer layer including a medial overlay in the area of the first metatarsal-phalanges joint and a lateral overlay in the area of the fifth metatarsal-phalanges joint, said medial and lateral overlays having medial and lateral flex notches for enhancing the flexibility of the material in the area of said notches, said medial flex notch extending over the area overlying and having a border on either side of the first metatarsal-phalanges joint, said lateral flex notch extending posterior of said medial flex notch to the area overlying the fifth metatarsal-phalanges joint and having a border on either side of the fifth metatarsal-phalanges joints, at least one of said layers of material defining a quarter portion with an ankle opening in the rearpart section, said quarter portion at said ankle opening having a greater height on the medial side than on the lateral side by a distance approximately equal to an average difference between the medial and lateral malleolar heights, the lowest point of the ankle opening in said quarter portion on the medial side being located anterior of the lowest point of the ankle opening in said quarter portion on the lateral side by a distance approximately equal to the difference between the medial and lateral malleolar lengths;
said sole including a midsole with a wedge section increasing the thickness of the midsole in the area generally between the metatarsal-phalanges joints and the heel, the anterior edge of said wedge section on the medial side of the sole being located posterior of the first metatarsal-phalanges joint and on the lateral side being located posterior of the fifth metatarsal-phalanges joint.

4,876,807

SHOE, METHOD FOR MANUFACTURING THE SAME, AND SOLE BLANK THEREFOR

Antti-Jussi Tiitola, Kaivanto, and Kari Pohja, Mikkeli, both of Finland, assignors to Karhu-Titan Oy, Finland

Filed Jul. 1, 1988, Ser. No. 214,608
Claims priority, application Finland, Jul. 1, 1987, 872898
Int. Cl.[4] A43B *5/00*
U.S. Cl. 36—114 **13 Claims**



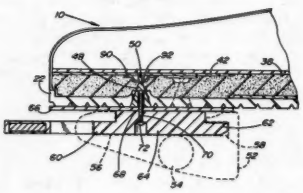
1. A shoe, having
a sole structure including an insole, a flexible midsole, and an outer sole forming a wearing surface,
said outer sole being formed, at least in a toe region of the shoe, with an upwardly-extending, cup-like edge, and
an upper comprising, at least in the toe region of the shoe, an inner layer, and an outer layer,
said outer layer and outer sole being attached with said upwardly-rising, cuplike edge of said outer sole lying between said inner and outer layers of said upper.

4,876,808

RUNNING AND CYCLING SHOE

Gerald W. Hsieh, P.O. Box 1299, El Toro, Calif. 92630

Filed Jun. 20, 1988, Ser. No. 208,487
Int. Cl.[4] A43B *5/14, 5/04*
U.S. Cl. 36—131 **8 Claims**



1. A sport shoe useful for cycling and running which comprises:
a. a composite sole including an outer sole, an intermediate sole, and a cushioning layer therebetween;
b. a plurality of through apertures in a preselected array in the toe portion of said outer sole;

c. brackets on the underside of said intermediate sole, each bracket having a receiving aperture and being positioned on said intermediate sole in said preselected array, whereby each aperture in said brackets is aligned with a respective through aperture in said outer sole; and

d. aperture seals comprising at least one flexible and slotted membrane extending across each of said through apertures.

4,876,809

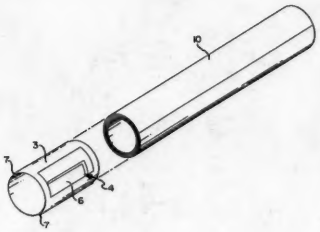
METHOD OF IDENTIFICATION OF ROLLED-UP SHEETS OF MATERIAL

Frank M. Johnson, 530 S. Seventh, Ann Arbor, Mich. 48103

Filed Dec. 16, 1987, Ser. No. 134,505

Int. Cl.[4] G09F *3/00*

U.S. Cl. 40—309 **5 Claims**



1. A method for identifying and storing rolled-up sheets of material, comprising the steps of:

rolling said material to a first predetermined diameter;

deforming a combination retainer and identification means from a collapsed-tube configuration thereof to a substantially cylindrical configuration thereof having a second predetermined diameter which is greater than said first predetermined diameter; and

applying said combination retainer and identification means to said rolled material to retain it in rolled condition at said second predetermined diameter, by sliding said combination retainer and identification means over one end of said rolled material to a position surrounding a substantially central portion of said rolled material.

4,876,810

OPEN SLEEVE SUPPORT FOR WIRE MARKING ELEMENTS WITH SNAP LOCK

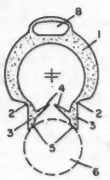
Ivana Piana, and Silvano Piana, both of Genova, Italy, assignors to Graphoplast S.p.A., Italy

Filed Jun. 15, 1988, Ser. No. 207,284

Claims priority, application Italy, Jun. 19, 1987, 12502 A/87; Mar. 25, 1988, 12446 A/88

Int. Cl.[4] G09F *3/00*

U.S. Cl. 40—316 **13 Claims**



1. A support for identifying electric wire or cable, which comprises:

(a) an elongated sleeve in the form of an open c having an internal central portion and opposed longitudinally extending free ends defining therebetween a longitudinally extending opening into said internal central portion,

(b) at least one of said free ends of said sleeve being connected via a weakened zone to a longitudinally extending member operable to urge an electric wire or cable into said internal central portion of said sleeve,

(c) said member having first and second portions projecting away from said weakened zone towards and away from said internal central portion of said sleeve, respectively, such that when said sleeve is mounted on a wire or cable by lateral pressure of the sleeve against the wire or cable, the sleeve will initially be subject to elastic deformation during its opening, while the member will oscillate around the weakened zone until it fits snugly around the wire or cable and, when the wire or cable is further pushed into the sleeve, elastic pressure of the member on the wire or cable will cause a snap action automatically pushing the cable into the sleeve and resulting in a renewed oscillation of the member around the weakened zone which will exert pressure on the wire or cable which rests inside the internal central portion of the sleeve.

4,876,811

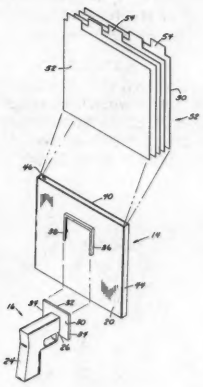
HAND-HELD MESSAGE SIGN

David Peltz, 5766 N. Bel Aire Dr., Glendale, Wis. 53209

Filed Feb. 19, 1988, Ser. No. 157,706

Int. Cl.[4] G09F *21/02*

U.S. Cl. 40—586 **19 Claims**



1. A hand-held message sign comprising:

a substantially vertical planar message-bearing member having a message-bearing front side and a back side with a central portion;

a pistol-grip member with a handle portion and a substantially horizontal extension portion having a distal end; and

means attaching the distal end of the horizontal member to the back side of the planar member in position thereon such that the pistol-grip member is behind the central portion whereby in use it is substantially occluded from view from the front by the message-bearing member.

4,876,812

EMERGENCY CAR CALL KIT

Katherine Haralson, 4617 Ledge Ave., Toluca Lake, Calif. 91602

Filed May 6, 1988, Ser. No. 191,199

Int. Cl.[4] G09F *21/04*

U.S. Cl. 40—592 **2 Claims**

1. An emergency kit for temporary storage and subsequent

display of selected visible messages when in assembled mounted condition on the exterior of a passenger carrying vehicle, said kit comprising a post means having a base member and an upright member for mounting on the base member, a mono-color display sheet comprising a single thickness of sheet material having a forward side and a rearward side, releasable engagement means on said display sheet having a releasable engagement with said post means in assembled condition for securing said display sheet on the post means in exposed display position, a plurality of substantially horizontally extending parallel retention bands on said forward side of the display

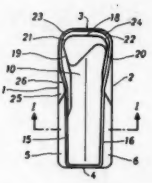
sheet, a container and multiple sets of substantially flat message characters adapted to be stored in sequential visible order in said container, each of said characters having substantially the same perimetrical shape and size, a display face having a color different from the color of said display sheet, and a rear face, said display faces being in visible position during storage to facilitate selection, attachment media adjacent the rear face of each character comprising a mechanical interlock adapted to releasably engage portions of said retention bands in selected sequence whereby to display messages on the bands visible from a direction facing said forward side of the display sheet.

4,876,813

MAGAZINE FOR FIREARMS

Martin Tuma, Solothurn, Switzerland, assignor to ITM Industrial Technology & Machines AG, Solothurn, Switzerland

Filed Dec. 7, 1988, Ser. No. 280,988
Int. Cl.[4] F41C *25/04*
U.S. Cl. 42—50 **4 Claims**



1. A magazine for a firearm specifically a hand gun, the magazine being for storing cartridges of various sizes and comprising:

a housing having two narrow side walls and two broad side walls, the latter terminating at an open end of the housing in magazine lips, cartridge guidewave of a V-shaped cross section respectively extending along said broad side walls in a longitudinal direction of said housing and projecting towards the inside thereof, respective housing wall areas forming flanks of the respective V-shaped cartridge guideways which, at a firing direction side, extend curvilinearly at least at edge areas at said open end of said housing and pass continuously curved into the said narrow side wall at the firing direction side, and a feeder having a cartridge support surface and a magazine spring biasing said feeder towards said open end of said housing;

said magazine lips each comprising an inner surface defining part of a jacket of a cylinder having a diameter substantially equal to the diameter of the base of the largest cartridge which is storable in the magazine, and elongated edges extending at an angle relative to each other and at any point along their longitudinal extent at a mutual distance which is smaller than the diameter of the base of the smallest cartridge which is storable in the magazine;

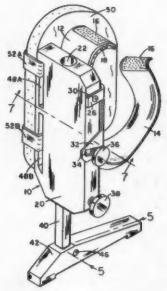
and said cartridge support surface of said feeder comprising a bulged surface section which ensures a line contact between said feeder and any cartridge shell supported thereupon.

4,876,814

GUN REST FOR SUPPORTING THE BUTTSTOCK

Philip C. Lombardo, P.O. Box 3106, Kirkland, Wash. 98083-3106

Filed Mar. 8, 1989, Ser. No. 320,710
Int. Cl.[4] F41C *29/00*
U.S. Cl. 42—94 **13 Claims**



1. A portable and pivotally adjustable gun rest for supporting and controlling a buttstock of a firearm comprising:

a vertical support assembly including a generally horizontal rigid base disposed transversely to the general orientation of said firearm, having top and bottom surfaces, and front and rear sides, and an upwardly extending elongated support member issuing from and rigidly affixed to the uppermost surface of said base and effectively shaped and dimensioned to provide a rigid and secure vertical support,

a vertical slide substantially rectangular in its cross section and of sufficient dimension to receive an aperture through its vertical length and cooperatively interconnected with said elongated support member through said aperture, enabling said vertical slide to raise and lower in elevation, a lock screw for releasably securing said vertical slide at desired elevations along the length of said elongated support member, and means issuing from and aligned to the rear of said vertical slide to facilitate the removable attachment of a recoil dampening pad so as to remain in the proper alignment during the pivotal adjustment and vertical adjustment of said gun rest,

a pivotally adjustable attaching bracket effectively shaped, dimensioned and contoured to secure and support said buttstock in an adjusted and controlled position, fastening means affixed to at least one end of said attaching bracket to facilitate the removable attachment from said attaching bracket to said buttstock, pivotally connecting means issuing from at least one edge of said attaching bracket and effectively positioned to pivotally connect said attaching bracket to said vertical slide, and releasable securing means issuing from at least one edge of said attaching bracket effectively shaped and positioned to releasably secure the pivotal motion from said attaching bracket to said vertical slide, whereby said firearm can be pivoted from side to side adjusting the firearm sights, be they open or telescopic, perfectly vertical for the proper eye to sight alignment regardless of the contour of said buttstock,

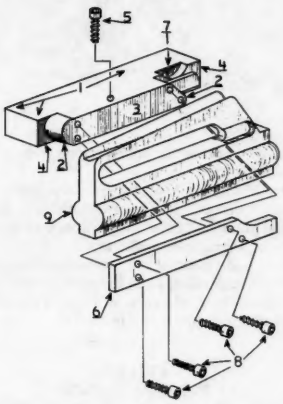
forming a secure, portable and fully adjustable rear gun rest for sighting and shooting.

4,876,815

SIGHT MOUNTING PLATFORM FOR COLT M-16/AR-15 RIFLE

Rufus O. Terrill, 1793 Saxon Pl., NE., Atlanta, Ga. 30319

Filed Feb. 24, 1989, Ser. No. 315,558
Int. Cl.[4] F41G *1/38*
U.S. Cl. 42—100 **2 Claims**



1. A sight mounting plate for use with a firearm having a carrying handle defining an elongated opening having an inner contoured surface which provides access of the operator's hand to facilitate carrying the weapon and a mounting hole extending through the top of the carrying handle to the opening; the sight mounting plate comprising:

an elongated first plate portion having a side surface which exceeds the elongated length of the handle opening;

an elongated second plate portion integral with the side surface of the first plate portion and shaped to completely match the inner contoured surface of the handle opening and having at least two blind side apertures in a side surface thereof and one blind top aperture on a top surface thereof; the top aperture located such that it is aligned with the mounting hole in the handle when the elongated second plate portion is inserted in the handle opening; and

a separate third plate portion having substantially the same length as the first plate side surface and including at least two apertures located to coincide with the at least two blind side apertures of the second plate portion;

wherein the second plate portion is inserted in the opening of the handle with the side surface of the first plate abutting a first side surface of the handle and fastened thereto via the mounting hole and the top aperture, and the third plate is abutted against an opposite side surface of the handle and is mounted to the second plate via the at least two apertures in the second and third plates.

4,876,816

TARGET ILLUMINATING AIMING SYSTEM

Melvin W. Triplett, P.O. Box 124, Guthrie, Okla. 73044

Filed Nov. 18, 1988, Ser. No. 273,264
Int. Cl.[4] F41G *1/34*
U.S. Cl. 42—103 **10 Claims**

1. A target illuminating aiming apparatus for use with a firing weapon adapted to be fired by an individual at a target within a target area comprising:

a housing a first end and a second end with the housing opening extending through a portion thereof and intersecting the first and the second ends of the housing;

means for securing the housing to the firing weapon;

means for generating and emitting light supported within the housing, comprising:

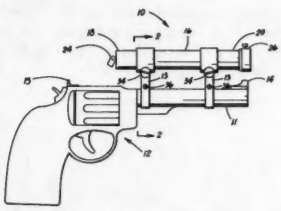
a light for emitting light mounted in the housing opening generally between the first and the second ends of the housing;

a reflector mounted in the housing generally near the light bulb for directly light emitted by the light bulb generally through the housing opening and out from the second end of the housing;

at least one battery mounted in the housing opening, the light bulb emitting light when electrical continuity is established between the light bulb and the battery;

means for selectively establishing electrical continuity between the light bulb and the battery and for interrupting electrical continuity between the light bulb and that battery;

means for focusing said light into at least a first zone and a second zone, wherein the first zone provides an aid for aiming the firing weapon at the target, and wherein the



second zone illuminates at least a portion of the target area comprising:

a lens mounted in the housing opening generally near the second end of the housing, the light being emitted from the light bulb and passing through the lens;

means for adjustably moving the lens for adjustably focusing the light emitted from the light bulb, comprising:

a vertical adjustment screw and a horizontal adjustment screw, wherein the vertical adjustment screw is mounted to the housing through a vertical bore such that an end of the vertical adjustment screw extending into the housing contacts the lens for moving the lens in a vertical direction, and wherein the horizontal adjustment screw is mounted to the housing through a horizontal bore such that an end of the horizontal adjustment screw extending into the housing contacts the lens for moving the lens in a horizontal direction;

means for biasing the lens against the vertical adjustment screw and the horizontal adjustment screw; and

a resilient material encircling the lens and disposed between the housing and the lens.

4,876,817

BOW-MOUNTABLE BLIND

Troy D. Hill, Box 146, Farley, Mo. 64028

Filed Jun. 17, 1988, Ser. No. 209,074
Int. Cl.[4] A01M *31/00*
U.S. Cl. 43—1 **8 Claims**

1. A bow-mountable blind comprising:

a camouflage unit including

a sheet of camouflage material, and support structure for coupling with said supporting said sheet,

said support structure including a pair of respective elongated support members for supporting said sheet therebetween, and shifting means for allowing shifting of said members between an extended position wherein said

members are generally transverse to the long axis of the bow and a collapsed position in which said members are generally aligned with the long axis of the bow; and

attachment means for attaching said unit to the bow,

said sheet having structure defining a plurality of separate

cuts therethrough forming a plurality of integral flaps and allowing shifting of said flaps in order to expose respective corresponding openings through said sheet such that said openings allow an archer holding the bow with said blind attached thereto to see through said opeinings and allow an arrow to extend therethrough.

4,876,818

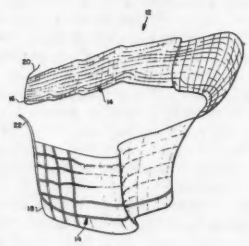
MARKED FISHING NET AND METHOD FOR MAKING SAME

Richard D. Fralick, East Sound, and Philip A. Ekstrom, Shaw Island, both of Wash., assignors to Northwest Marine Technology, Inc., Shaw Island, Wash.

Filed May 4, 1988, Ser. No. 190,139

Int. Cl.[4] A01K *71/00*

U.S. Cl. 43—7 **53 Claims**



1. A method of manufacturing fishing gear, comprising the steps of:

marking a preselected strand at spaced intervals with sequential numerical codes;

substantially inextricably incorporating said preselected strand in a cord of a multiplicity of strands so that said preselected strand extends along the length of said cord;

incorporating said cord in a net so that said cord extends substantially from one end of said net to an opposite end thereof; and

locating ends of said cord at readily accessible preselected points relative to said net so that a smallest numerical code and a largest numerical code on said cord are easily determinable upon visual inspection of said net.

4,876,819

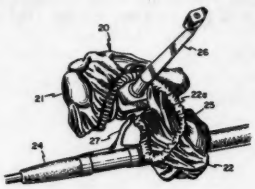
FISHING REEL PROTECTOR

James R. Clifford, 12013-22nd St., Santa Fe, Tex. 77510

Filed Mar. 27, 1989, Ser. No. 329,350

Int. Cl.[4] A01K *97/08*

U.S. Cl. 43—26 **4 Claims**



1. A fishing reel protector comprising a body member made from flexible material,

a plurality of interconnected protective pockets formed of the body member made from flexible material,

each of the plurality of pockets fashioned to accommodate a portion of a reel to be protected

wherein the body member has a mouth, each pocket entirely or partially extending from the mouth, and

an elastic band attached to and around the mouth to keep the reel protector in place on the reel.

4,876,820

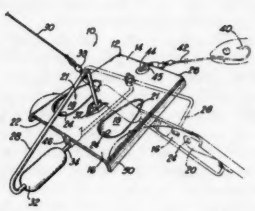
FISHING PLANER

William C. Vann, 79 S.Underwood Dr., Garden City, S.C. 29576

Filed Jan. 13, 1989, Ser. No. 296,624

Int. Cl.[4] A01K *95/00*

U.S. Cl. 43—43.13 **15 Claims**



1. A fishing planer, comprising:

a planer body having an upper surface and a lower surface, said planer body having a concavity on the upper surface extending into a convexity on the lower surface, said concavity and said convexity having a hole extending therethrough to allow water flowing under said planer body to pass therethrough to the upper surface of said planer body to mix with water flowing over the upper surface in order to reduce swirl below said planer body; means for attaching said planer body to a reel line; and means for attaching said planer body to a bait line.

4,876,821

MAGNETIC AUTOMATIC RESET ANIMAL TRAP

Paul Benzie, P.O. Box 244, Bellefonte, Pa. 16823

Filed Dec. 27, 1988, Ser. No. 290,457

Int. Cl.[4] A01M *1/12, 23/14*

U.S. Cl. 43—69 **5 Claims**

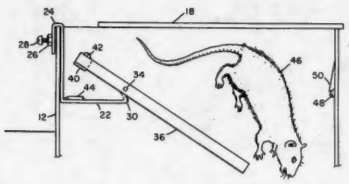
1. A trap for mouse size animals adapted for attachment to a container having substantially vertical walls with a substantially flat top, comprising in combination:

a clamping means adapted to be secured to the top of said container walls, comprising in combination:

a downwardly disposed slotted member adapted to fit over the top of said vertical walls of said container;

a hanging bracket integrally attached to said slotted member extending downwardly within said container;

a rotatable screw extending through said slotted member and adapted to clamp said vertical walls of said container;



a walkway pivotally attached to said hanging bracket and adapted to allow said walkway to rotate;

a magnetic release device attached to said walkway and to said hanging bracket;

a bait holding device attached to said container;

a reset device attached to said walkway adapted to rotate said walkway to its set position.

4,876,822

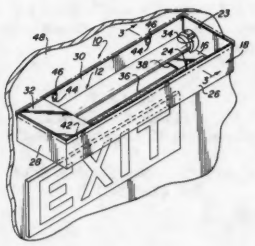
FLYING INSECT CONTROL UNIT USING LIGHTS AND ADHESIVES

James N. White, 506 Exton Rd., Hatboro, Pa. 19040

Filed Apr. 4, 1989, Ser. No. 333,168

Int. Cl.[4] A01M *1/04*

U.S. Cl. 43—113 **21 Claims**



1. A flying insect control unit including:

a. an enclosure including a compartment provided by a bottom wall and a closed peripheral side wall means extending laterally from said bottom wall and terminating in upper marginal edges defining an upper opening into said compartment;

b. said bottom wall including peripheral edges defining a passageway extending through a portion of said bottom wall, said bottom wall including a continuous surface adjacent at least one of said peripheral edges;

c. a member for trapping flying insects thereon, said member including a bottom surface adhered to said continuous surface of the bottom wall, an upper, light-reflective surface and a material on said light reflective surface for trapping flying insects thereon;

d. a light source for emitting ultraviolet radiation, said light source being disposed above said passageway and said upper, light-reflective surface of said member, whereby light emitted by said light source is transmitted through said passageway and is reflected toward the upper opening into said compartment from the light-reflective surface, said light-reflective surface with the material for trapping flying insects thereon being concealed from view during use of the unit.

4,876,823

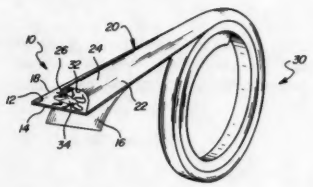
INSECT TRAP

Anthony Brunetti, 423 Charlotte, Royal Oak, Mich. 48073

Continuation of Ser. No. 31,351, Mar. 30, 1987. This application Jun. 14, 1988, Ser. No. 207,901

Int. Cl.[4] A01M *1/14*

U.S. Cl. 43—114 **9 Claims**



1. A trap for insects consisting of an elongated member formed of sheet material having a uniform cross section along its length, said cross section being characterized by:

a flat base member having an underside and an upperside, the underside being coated with a pressure sensitive adhesive operative to allow the section to be secured to a supporting surface with the underside of the base member in contact with the surface;

an upper portion connected to the base member at one edge thereof, said upper portion comprising three sections running longitudinally along the base;

a first section projecting substantially laterally upwardly away from the base section;

a second section extending substantially parallel to the base, so as to overlie the base; and

a third section extending substantially downwardly toward the base with the free edge of the third section terminating at a spaced distance from the base providing an area between the base and the free edge of the base which is clear of supporting structure; and

a pressure sensitive adhesive coating on the interior opposed sides of the trap section, whereby an insect walking over the upper side of the base section would become entangled in the last said adhesive.

4,876,824

CANDY PLANTER

Robert Newsteder, Utica, N.Y., assignor to Chocolate Pix, Inc., Utica, N.Y.

Filed Mar. 17, 1988, Ser. No. 169,437

Int. Cl.[4] A01G *9/02*

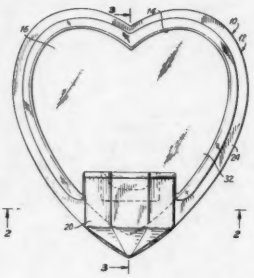
U.S. Cl. 47—66 **11 Claims**

1. A combination food holder and planter comprising:

a main frame having an opening;

a substantially flat means for supporting food removably connected to said main frame within said opening with the

food then being constrained from movement in part by abutting against said food support means; and



plant support means connected to said main frame for supporting a plant within said opening when said food support means is removed from said main frame.

4,876,825

VEHICLE DOOR

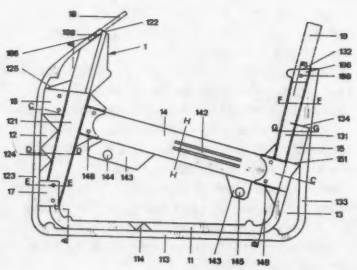
Jakob Widrig, Winterthur, and Gunther Wulff, Stein am Rhein, both of Switzerland, assignors to Swiss Aluminium Ltd., Chippis, Switzerland

Filed Nov. 30, 1987, Ser. No. 126,709

Claims priority, application Switzerland, Dec. 11, 1986, 4944/86

Int. Cl.[4] B60J *5/04*

U.S. Cl. 49—502 **21 Claims**



1. A vehicle door comprising: and outer wall, an inner wall and a single equipment carrier onto which all other door parts are arranged positioned between said outer and inner walls; said equipment carrier having a high degree of rigidity and providing effective protection against collision forces; said equipment carrier serving as a fastening base for at least two door hinges and for at least one door mounted latch arrangement; and said equipment carrier consisting of a bottom boom section having two legs directed upwards, each said leg being positioned at an end of said bottom boom section and being at least partially formed by a hollow frame, said boom section and legs consisting of a casting, at least one strut formed by an extruded section connecting said legs to one another at a distance from the bottom boom section; and said at least one strut being connected to said legs by having been partially cast thereto in order to provide said high degree of rigidity.

4,876,826

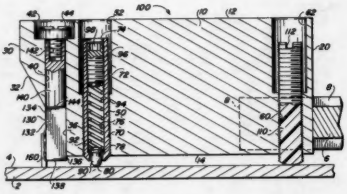
GRINDING AND POLISHING APPARATUS

Anthony J. Denboer, 8130 N. 17th Dr., Phoenix, Ariz. 85021

Filed Sep. 19, 1988, Ser. No. 246,404

Int. Cl.[4] B24B *7/00*

U.S. Cl. 51—125 **21 Claims**



1. Grinding and polishing apparatus for holding a sample to be ground and polished for examination on a grinding and polishing wheel, comprising, in combination:

block means, including a block having

a top surface,

a bottom surface,

a rear surface,

a top front surface adjacent to the top surface,

a sloping surface adjacent to the top front surface,

a bottom front surface adjacent to the bottom surface, and

a shoulder extending between the sloping front surface and the bottom front surface;

paddle means removably securable to the block, including a paddle block to which the sample is secured; and

means for securing the paddle means to the block against the shoulder in which the means for securing the paddle mean to the block includes a post extending outwardly from the paddle block and a paddle bore in the block for receiving the post, and means for securing the post in the paddle bore wherein the paddle bore extends into the block from the shoulder.

4,876,827

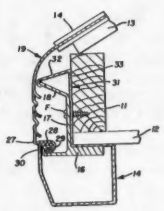
GUTTER ASSEMBLY

Robert D. Williams, Box 95, Lumby, British Columbia, Canada (V0E 2G0)

Filed Jan. 3, 1989, Ser. No. 190,455

Int. Cl.[4] E04D *13/06*

U.S. Cl. 52—12 **5 Claims**



1. An improvement in a gutter assembly for a roof structure which includes a fascia board having a vertical outer surface and a roof deck inclinded towards the fascia board, the improvement commprising an elongated trough portion and an elongated water shed portion, a plurality of clips securing said trough portion to said roof structure, said water shed portion comprising an upper wall engaging said roof deck and a lower wall in a substantially vertical plane extending to said trough portion with an integral curved wall joining said upper and

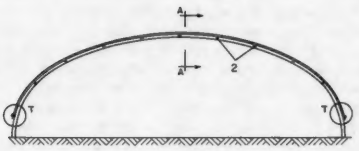
lower walls, a plurality of vertically spaced rows of horizontally spaced vertical slots and horizontal slits connecting pairs of said vertical slots in said lower wall defining flanges in said lower wall between said vertical slots and above said horizontal slits, each of said flanges being inturned and curved, the apex of each of said curved flanges being within the substantially vertical plane of said lower wall, a plurality of vertically spaced, longitudinally extending recessed curved areas between each of said rows defining a portion of each of said inturned curved flanges whereby water flowing downwardly on said water shed portion will follow said recessed curved areas and said inturned curved flanges into said trough portion.

4,876,828

ARCHED, TRANSLUCENT COVERS FOR SPORT GROUNDS, SWIMMING POOLS, HOTHOUSES AND THE LIKE

Uri Brill, 77 Sweden Street, Haifa, Israel

Filed Jan. 25, 1988, Ser. No. 147,898
Claims priority, application Israel, Sep. 29, 1987, 83837
Int. Cl.[4] E04B *7/08, 7/16*
U.S. Cl. 52—23 **22 Claims**



1. A translucent arched cover for swimming pools, sport grounds, hothouses and the like comprises

a supporting structure including a plurality of rigid, arcuate ribs of uniform cross section held in parallel, distanced alignment by a plurality of purlins extending between two adjacent ribs, each said rib being bent from rigid bar material containing an outwardly extending channel and two parallel co-planar flanges on both sides of said channel extending along the outside of said structure,

a plurality of rectangular panels of a translucent, semi-rigid material of a length slightly shorter than the length of said ribs and of a width coextensive with the distance between two adjacent ribs, each said channel being positioned with its longitudinal margins on and along said flanges of two adjacent ribs,

a plurality of flexible strips, one strip for each said rib, of a width coextensive with the width of said rib across said two flanges and of a length corresponding to the length of said translucent panels, the ends of each said strip being provided with tension means cooperating with the lower portions of the corresponding rib,

wherein each said strip is positioned along the outside of a rib covering the margins of said panel or panels positioned on and along said flanges of said rib, and is tensioned on said panel or panels by said tensioning means, thus securing said panels to said ribs by pressure and friction.

4,876,829

INFLATABLE TENT STRUCTURE

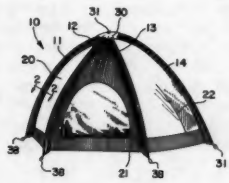
Michael J. Mattick, Charlotte, N.C., assignor to Pneumo-Beam International Ltd., Charlotte, N.C.

Filed Jan. 19, 1988, Ser. No. 145,051
Int. Cl.[4] E04B *1/34*
U.S. Cl. 52—2 **8 Claims**

1. An inflatable tent structure comprising:

(a) a plurality of pneumatically interconnected, elongate inflatable tubes positioned in spaced-apart relation around the perimeter of the tent structure for being inflated in unison, said tubes defining a dome-shaped structure terminating at an apex, said tubes converging in pneumatic interconnection with each other in a single plane at the apex of the dome-shaped structure;

(b) valve means for inflating the tubes and comprising a manifold into which all of the tubes interconnect at the apex of the dome-shaped structure; and



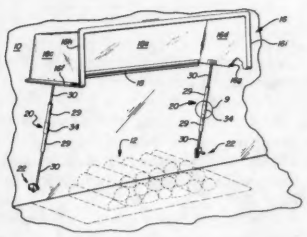
(c) a plurality of wall panels suspended from and between adjacent tubes to define an enclosure of the tent whereby the tubes define a support structure exterior to the enclosure of the tent; wherein said tubes include an interiorly projecting flange to which said wall panels are attached in spaced-apart relation.

4,876,830

OUTDOOR COVER ASSEMBLY

John E. Wate, 755 W. Buno, Milford, Mich. 48042

Filed Sep. 6, 1988, Ser. No. 240,618
Int. Cl.[4] E04B *1/344*
U.S. Cl. 52—29 **18 Claims**



1. An cover assembly adapted to be mounted on a wall surface for purposes of selectively sheltering items positioned adjacent the wall surface on a base surface, said cover assembly comprising:

(A) a cover structure including

(1) a top wall;

(2) a front wall extending downwardly from the front edge of said top wall, and

(3) left and right side walls joined at their upper edges to respective side edges of said top wall and at their forward edges to respective side vertical edges of said front wall;

(B) hinge means secured to the rearward edge of said top wall and adapted to be secured to said wall surface at a height above the base surface generally corresponding to the height of the cover structure so that the cover structure may be pivotally moved about the hinge pivot axis between a lowered storage position in which the lower edges of the side walls and the front wall are resting on the base surface and the rearward edges of the side walls and top wall are adjacent the building surface, and a raised access position in which the cover structure extends generally forwardly from the building surface to provide access to the sheltered items; and

(C) assist means positioned between said cover structure and

the wall surface operative to store energy in response to movement of said cover structure from its raised position to its lowered position and operative in response to movement of said cover structure from its lowered position toward its raised position to release said stored energy to assist in the upward movement of said cover structure to its raised position;

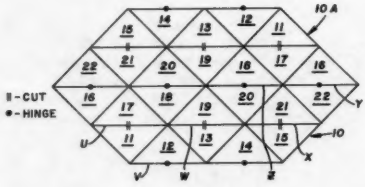
(D) said assist means comprising at least one strut assembly adapted to be secured at its lower end to the wall surface at a lower attachment point between said pivot axis and the base surface and secured at its upper end to said cover structure at an upper attachment point spaced from said hinge pivot axis and positioned, with said cover member in its lowered position, adjacent the rearward edge of said one side wall and below said hinge axis.

4,876,831

FOLDING MODULAR BUILDING STRUCTURE

John F. Runyon, 91 Kent St., Apt. 4, St. Paul, Minn. 55102

Filed Mar. 14, 1988, Ser. No. 167,885
Int. Cl.[4] E04B *1/346*
U.S. Cl. 52—70 **18 Claims**



1. In a folding building structure comprised of a plurality of flexibly interconnected structrual modules,

(A) each of said modules comprised of a plurality of hinged structural elements defining twelve equal sized right isosceles triangular components,

(B) each of said modules, if laid flat, defining a trapezoid, the hypotenuses of the triangles forming the trapezoid being parallel,

(C) each of said trapezoidal modules including a first row of five triangular components and a second row of seven triangular components,

(D) the hypotenuses of two of said two triangular components in said first row defining the top edge of the trapezoidal module,

(E) the hypotenuses of four of said triangular components in said second row defining the base of the trapezoidal module,

(F) the shared hypotenuses of the remaining three triangular components of said first row and the remaining three triangular components of said second row defining an intermediate line parallel to and midway between the top edge and base of the trapezoidal module,

(G) said interconnected modules being disposed in repeating right and left-handed mirror image form, each right handed module being adjacent to a left-handed module, and

(H) said structural elements being composed of linear strut-like elements flexibly connected at their ends point-to-point to like linear elements, the improvement which consists in:

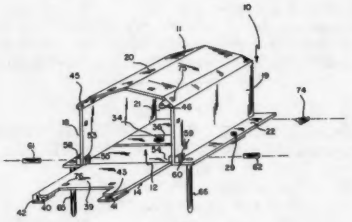
the hyppotenuses defining the top edges and bases of said trapezoidal modules being hinged and the hypotenuses defining the alternating intermediate lines of said trapezoidal modules being severed and reversibly separable, i.e., reattachable.

4,876,832

WALKING POWER MOWER ENCLOSURE

Ervin W. Wasserman, 1515 Seward, Roselle, Ill. 60172

Filed May 7, 1987, Ser. No. 46,704
Int. Cl.[4] E04H *6/02*
U.S. Cl. 52—79.1 **2 Claims**



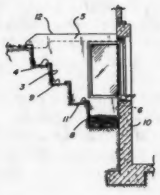
1. An enclosure for a walking mower that my be easily user installed, comprising: a one-piece housing having spaced side walls, a rear wall and a top wall with an open front and without a bottom wall, a ground engaging cross member separate from the housing, means for attaching the crosss member to the ground prior to the attachment of the housing, means to attach the housing to the cross member after the cross member is attached to the ground, a door pivotally connected to the side walls positioned to at least partly close the open front of the housing, and means for the user to easily adjust the spacing between the side walls so the pivotal connection between the door and the side walls is properly maintained.

4,876,833

ACCESSIBLE AREAWAY SYSTEM

James A. Gefroh, and Fredric J. Hattman, both of Fort Collins, Colo., assignors to RM Base Company, Fort Collins, Colo.

Filed Mar. 14, 1989, Ser. No. 323,351
Int. Cl.[4] E04F *17/06*
U.S. Cl. 52—107 **26 Claims**



1. An open areaway escape system for a building having: a basement window having a top and a bottom, and a foundation, said areaway escape system comprising:

a. a unitary body comprising:

(1) a wall member having a top edge, a bottom edge, and a foundation face edge;

(2) an uncovered upper opening adjacent to the top edge of said wall member;

(3) an upper flange between said uncovered upper opening and said wall member along said top edge;

(4) a vertical opening adjacent to the foundation face edge of said wall member; and

(5) a floor opening adjacent to the bottom edge of said wall member.

b. a positive means for escaping;

c. a means along said vertical opening for attaching said unitary body to the exterior of the foundation of said

building adjacent to said basement window without significantly altering said foundation; and

d. a means for draining the areaway.

4,876,834

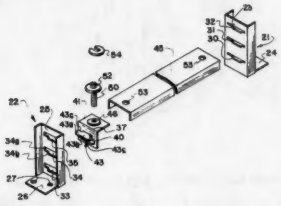
DOUBLE ADJUSTABLE DUCT SUPPORT

Charles N. Domigan, Coolville, Ohio, assignor to Butler Manufacturing Company, Kansas City, Del.

Filed Aug. 9, 1988, Ser. No. 230,489

Int. Cl.[4] E04B *5/48*

U.S. Cl. 52—126.2 **1 Claim**



1. A double adjustable duct support to be mounted on a concrete pouring form or on a concrete subfloor for supporting and leveling duct above the form or the floor, the support comprising:

a pair of spaced apart support standards each having a foot section and an upright section, each foot section to be mounted on and secured to a pouring form or a subfloor with the upright section extending substantially vertically upward therefrom and each upright section having a plurality of vertically spaced adjusting slots;

a pair of adjusting supports each having an adjusting arm and a mounting arm, the respective mounting arms extending toward one another and the adjusting arms respectively engaging one side of an upright section;

on each adjusting arm, an adjusting tab extending thru one of the adjusting slots in an upright section and engaging the opposite side of the upright section to cause the adjusting arm to tightly engage the upright section;

on each mounting arm, a nut and threaded in each nut an adjusting screw having a support platform and a head extending upwardly therefrom;

a bridge member having opposite end sections each of which has a clearance aperture receiving the head of an adjusting screw and being supported on the support platform of the adjusting screw;

said adjusting tabs and adjusting slots providing for said bridge member to be positioned vertically with respect to said feet in a plurality of discrete, spaced-apart positions; and

said adjusting screws providing for said bridge member to be positioned vertically with respect to said feet when the bridge member is in any of said discrete, spaced-apart positions.

4,876,835

WORK SPACE MANAGEMENT SYSTEM

James O. Kelley, Spring Lake, Mich.; William E. Stumpf, Minneapolis, Minn., and Frank A. Friedman, San Francisco, Calif., assignors to Herman Miller, Inc., Zeeland, Mich.

Continuation-in-part of Ser. No. 648,900, Sep. 10, 1984. This application Apr. 7, 1987, Ser. No. 35,351

Int. Cl.[4] E04H *1/06*

U.S. Cl. 52—239 **49 Claims**

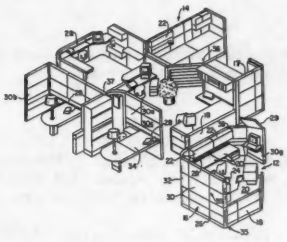
1. A work space management system for dividing a space into separate work areas comprising:

a rigid structural framework formed of rigid structure rectangular frames rigidly joined together at the edges thereof to form at least one work area;

each of said frames having outer faces on opposite sides thereof and receiving means on said opposite sides of said frames;

a plurality of interchangeable tiles of relatively equal modular size and substantially common height, with each of said tiles having an attaching means cooperating with said receiving means on said frames for removably mounting said tiles to said frames for ease of placement on and removal from said frames;

said tiles being mounted to the outer faces of said frames to substantially cover both sides of said frames from a bottom



portion thereof to a top thereof in juxtaposed parallel relationship;

said tiles having a width substantially equal to the width of the frames to which said tiles are mounted and have a height such that at least two of said tiles are mounted in vertical juxtaposition on each of said frames;

some of said tiles having a decorative surface and other of said tiles having a structure to serve a function other than decorative in the work area defined by said framework and tiles;

whereby said tiles, whether decorative or functional, can be selectively interchanged easily and quickly with tiles mounted within the same frame or with tiles mounted on different frames within the system.

4,876,836

SUPPORT AND ATTACHMENT SYSTEM FOR LONG-SPAN BEAMS

Marc E. Irigoyen, 53, cours de l'Intendance, 33000 Bordeaux, and Pierre Bourrier, 2, rue de La Planche, 75007 Paris, both of France

PCT No. PCT/FR88/00096, § 371 Date Oct. 24, 1988, § 102(e) Date Oct. 24, 1988, PCT Pub. No. WO88/06214, PCT Pub. Date Aug. 25, 1988

PCT Filed Feb. 22, 1988, Ser. No. 276,449

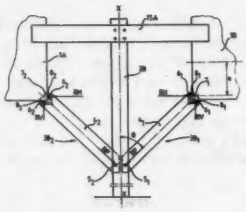
Claims priority, application France, Feb. 23, 1987, 87 02306

Int. Cl.[4] E04B *1/36*

U.S. Cl. 52—263 **19 Claims**

1. Improved system for supporting and attaching long-span laminate or composite material beams (1A, 1B, 1C, etc.) on and to metal supporting posts (2A, 2B, 2C, etc.), characterised in that each post is provided with at least one buttress member ($3A_1$, $3B_1$, $3C_1$, etc.) articulated at its end to an articulation shaft (5_1, 5_2, etc.) a to the corresponding post and the upper end of which is provided with a two-wing channel (6_1, 6_2, etc.) on which bears a corner strengthening member (7_1, 7_2) attached to the end of a long-span beam (1A, 1B, etc.) through the intermediary of contact members (8_1, 8_2, etc.) with which said corner strengthnening member is provided, whereby the vertical reaction force R_V to the weight of the beam is trans-

ferred into a buttress force R_P on the axis of the corresponding leg member ($3B_1$, $3B_2$)



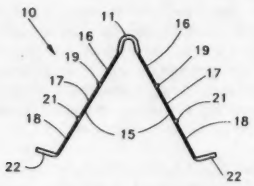
which produces a horizontal longitudinal stress force R_H in the corresponding long-span beam.

4,876,837

CORNER BEAD STRUCTURE

Patrick M. Kelly, Cleveland; Robert E. Howlett, Middleburg Heights; Paul A. Pomeroy, Spencer, and Dennis A. Alvarez, Euclid, all of Ohio, assignors to USG Interiors, Inc., Chicago, Ill.

Filed Aug. 22, 1988, Ser. No. 234,810
Int. Cl.[4] E04B *2/00*; E04F *13/06*
U.S. Cl. 52—287 **16 Claims**



1. In a wall structure including two planar wall portions intersecting at a corner, and a corner bead mounted on said corner with a flange secured to each of said wall portions, the improvement comprising said corner bead including a single strip of metal providing a shaped nose having a first thickness, and each of said flanges having a shear-deformed band extending lengthwise thereof having a reduced thickness substantially less than said first thickness.

4,876,838

PANEL JOINT

Bruce A. Hagemeyer, Pella, Iowa, assignor to Rolscreen Company, Pella, Iowa

Division of Ser. No. 69,055, Jul. 2, 1987. This application Jan. 31, 1989, Ser. No. 304,214
Int. Cl.[4] E06B *3/70*
U.S. Cl. 52—455 **2 Claims**

1. A panel joint comprising,

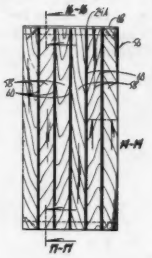
a pair of panel members each having mortices to receive a spline,

said mortices extending to an exterior edge of said panel members,

a spline positioned in said mortices and being exposed along one edge which is substantially coplanar with said exterior edge of said panel members,

screw means accessible from said one edge of said spline extending angularly through said spline into at least one of said panel members for pulling said one panel member tight against said other panel member, and

said pair of panel members forming a door having a plurality of vertically oriented abutting panel members with exterior vertically extending grooves running lengthwise of the door at the interface of each pair of abutting panel members, said mortices being at the top of the panel members and extending the substantial width of the door and



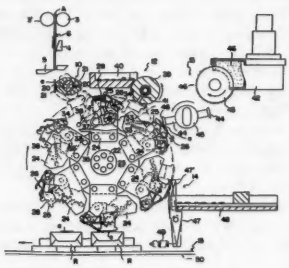
positioned between the front and back sides of said door, said spline having two legs with one leg received in said mortices and the other leg extending horizontally over the top end edge of the door and covering the top ends of said grooves.

4,876,839

APPARATUS FOR APPLYING SEAL-STRIPS TO PACKAGES TRAVELLING ON A CONVEYOR

Sumio Honda; Taizo Ogata, both of Chiba, and Tadao Etani, Tokyo, all of Japan, assignors to Japan Tobacco Inc./Tokyo Automatic Machinery Works Ltd., Tokyo, Japan

Filed Dec. 22, 1987, Ser. No. 136,541
Claims priority, application Japan, Dec. 25, 1986, 61-201923
Int. Cl.[4] B65C *9/02, 9/22*
U.S. Cl. 53—137 **11 Claims**



1. Apparatus for attaching seal-strip segments to individual packages where said segments are in the form of a strip having opposed surfaces, said apparatus comprising:

(a) a transfer element movable periodically between a receiving position for receiving a segment from a supply thereof, and a transfer position for transferring the segment, said transfer element including means for releasably holding a segment with one surface thereof in contact with said element;

(b) a rotatable turret having a plurality of stations at equal angular positions about the axis of rotation of the turret, each station having a support surface for supporting a segment;

(c) means for rotating said turret in synchronism with movement of said transfer element such that, during one revolution of said turret, a different one of said stations is opera-

tively associated with said transfer element each time the latter moves to its transfer position;

(d) holding means in each station made effective when the latter is operatively associated with said transfer element for effecting a transfer of a segment from said transfer element to a support surface such that the other surface of the segment is held in contact with the support surface of the station and the one surface of the segment is exposed; and

(f) an adhesive applicator for applying adhesive to the one surface of the segments held by the station;

(g) said turret having an angular position at which a surface of a package tangentially contacts a station for adhering the segment held thereon to the package;

(h) said transfer element being rotatable and having a holding surface that faces a station on the turret when the element is in its transfer position, said means for releasably holding a segment being suction means connected to said holding surface, said element being constructed and arranged so that the holding surface is essentially tangent to the support surface of a station when the element is in its transfer position so that the other surface of a segment in contact with said holding surface, overlies the support surface of the station, the holding means of the station being constructed and arranged to mechanically engage the segment and hold the same against the support surface thereby stripping the segment from the transfer element as the turret and the transfer element rotate simultaneously.

4,876,840

BAG COVERING APPARATUS

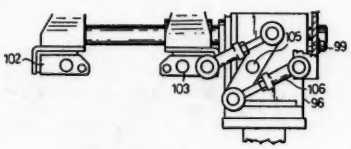
Yoshiyuki Takamura, Nagoya, Japan, assignor to Fuji Pack System Ltd., Nagoya, Japan

Filed Sep. 16, 1988, Ser. No. 245,721

Claims priority, application Japan, Sep. 19, 1987, 62-235619; Aug. 8, 1988, 63-197656

Int. Cl.[4] B65B *7/02, 57/04, 61/14*

U.S. Cl. 53—137 **12 Claims**



1. A bag covering apparatus that puts a cover folded in two at a folding portion on an opening of a bag, comprising:

folding means that can operate to fold said cover in two at said folding portion,

cover retaining means provided adjacent to said folding means, having at least two holding portions capable of holding said folding portion of said cover, said folding portion of said cover being inserted into each of said holding portions of said cover retaining means by the action of said folding means, said cover retaining means being movable such that when one of said holding portions faces said opening of said bag, the other one of said holding portions facing said folding means, and

linking means, operationally connected to said cover retaining means, that makes said opening of said bag and said holding portions of said cover retaining means facing said opening of said bag approach each other by the action of said folding means, thereby positioning said cover on said opening of said bag.

4,876,841

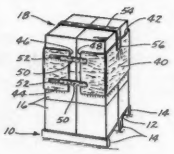
METHOD AND MEANS FOR SECURING PALLETIZED MATERIALS

Janet R. Jensen, 107 Northwest First St., (Box 36), Melcher-Dallas, Iowa 50163

Filed May 23, 1988, Ser. No. 197,670

Int. Cl.[4] B65B *13/02*

U.S. Cl. 53—399 **5 Claims**



1. A combination comprising:

a pallet having a horizontal supporting surface;

a plurality of irregularly shaped and sized containers having groceries therein, said containers being piled on top of said supporting surface and piled upon one another to form a stack of said containers, said stack having a perimeter and extending upwardly from said supporting surface to a stack top;

wrapping means extending around said perimeter of said stack and engaging at least a portion of said plurality of said containers to prevent said containers and said groceries from falling from said stack, said wrapping means comprising an elongated flexible sheet member, at least first and second elongated straps, and at least first and second elongated complimentary straps;

said sheet member having an upper horizontal edge, a lower horizontal edge, a first end and a second end, said sheet member having a vertical height between said upper and lower horizontal edges which is at least one half of the height of said stack of containers;

said first and second straps having first ends attached to said first end of said sheet member in vertical spaced relation to one another, said first and second straps also having second ends adjacent said second end of said sheet member;

said first and second complimentary straps extending horizontally and being attached to said second end of said sheet member in vertical spaced relation with one another;

each of said first and second straps having an elongated securing member attached to said second end thereof;

each of said first and second complimentary straps having a complimentary securing member attached thereto;

said first and second complimentary securing members being detachably retentively engageable with said first and second securing members so as to permit said first and second straps to be detachably secured to said first and second complimentary straps, whereby said wrapping means can be detachably secured in snug surrounding relation to said stack of said containers of groceries.

4,876,842

METHOD OF AND APPARATUS FOR PACKAGING PRODUCT MASSES IN A FORM, FILL AND SEAL MACHINE

Steven Ausnit, New York City, N.Y., assignor to Minigrip, Inc., Orangeburg, N.Y.

Filed Jan. 15, 1988, Ser. No. 144,094

Int. Cl.[4] B65B *9/08, 57/04, 61/18*

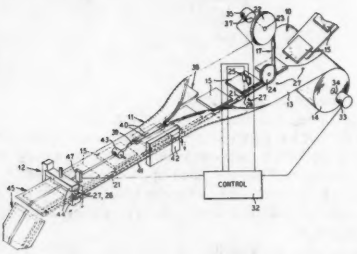
U.S. Cl. 53—410 **20 Claims**

1. A method of packaging product masses in a form, fill and seal machine, comprising:

running a continuous length of packaging film in the following order through a succession of work stations in the machine, including a loading station wherein product

masses are successively placed into engagement with the film at substantially uniformly spaced intervals, a product mass enclosing and film sealing station wherein the film is wrapped and sealed into a tube about the product, and a cross sealing and package separation station wherein the film tube is cross sealed in the spaces between the successive product masses to seal the product masses within individual packages;

adjacent to said loading station joining in corunning relation with the packaging film, a continuous length of separately formed plastic reclosable fastener assembly having interlocked profile strips spot sealed together at package length intervals;



effecting said joining near one side of said product masses, and orienting the co-running fastener strip assembly and the packaging film so that the spot seals of the strip are located in alignment with the spaces between the product masses on the film;

adjacent to said enclosing and sealing station securing the fastener assembly permanently within a fold of said film so that a package length section of the fastener strip assembly will be present in each individual product package; and

at the cross sealing station cross sealing the fastener strip assembly spot seals with the cross sealing of the film tube.

4,876,843

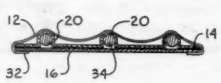
TAMPER INDICATOR FOR A BLISTER PACKAGE AND METHOD OF ASSEMBLY

Denise M. O'Brien, Whippany, and Carlo P. Croce, Leonia, both of N.J., assignors to Warner-Lambert Company, Morris Plains, N.J.

Division of Ser. No. 134,342, Dec. 17, 1987, Pat. No. 4,838,425. This application Nov. 28, 1988, Ser. No. 276,581

Int. Cl.[4] B65B *53/06, 11/52, 9/02*

U.S. Cl. 53—410 **2 Claims**



1. A method for affixing a tamper indicator film to a package having a base formed with a recess and a rupturable lid positioned thereon to define a margin therebetween and hold articles within the recess comprising the steps of:

(a) Registering a heat seal coating on said lid near said margin;

(b) Dimensioning said film to cover said base with the periphery of said film having suitable overlap to extend beyond said margin;

(c) Placing said film against said base; and

(d) Heating the periphery of said film to shrink and fold the periphery of said film over said margin to bring said overlap periphery into contact with said coating on said lid.

4,876,844

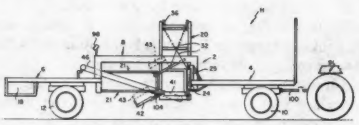
FIELD CROP HARVESTING, CARTON PACKAGING AND PACKED CARTON HANDLING MACHINE AND METHOD

Donald M. Grey, Selma, Calif., assignor to Grey Technologies, Inc., Selma, Calif.

Filed May 19, 1989, Ser. No. 354,896

Int. Cl.[4] B65B *67/02*

U.S. Cl. 53—458 **28 Claims**



1. A field crop harvesting, carton packaging and packed carton handling machine, comprising:

(a) transport means including a front section, a central section and a trailing section;

(b) said front and trailing sections having ground engaging means and each having a platform mounted on said ground engaging means;

(c) said front platform including area means for stacking and supplying non-erected cartons and for erecting said non-erected cartons;

(d) said central section including conveyor support means including a central conveyor means and left and right conveyor means;

(e) said left and right conveyor means each including erected carton receiving and supplying means;

(f) said left and right conveyor means each including a series of carton packing stations;

(g) said left and right conveyor means each including a conveyor for moving packed cartons to said central conveyor means;

(h) said central conveyor means including a rearwardly moving conveyor for transporting said packed cartons rearwardly to said trailing platform; and

(i) said trailing platform including area means for receiving, handling and sealing said packed cartons and distributing said sealed cartons.

4,876,845

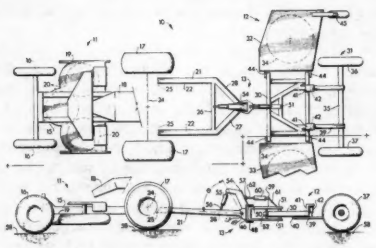
SELF PROPELLED MOWER AND TOWED MOWER WITH ADJUSTABLE HEIGHT CONNECTION

James D. Sturgill, St. Simons Island, Ga., assignor to Robert M. Torras, St. Simons Island, Ga.

Filed Apr. 12, 1989, Ser. No. 337,188

Int. Cl.[4] A01D *34/56, 34/66*

U.S. Cl. 56—6 **5 Claims**



2. In combination with a self propelled powered mower and a trailing towed mower, said powered mower including driving wheels for propelling said powered mower in a forward direction, and a draw bar connected at one end to said pow-

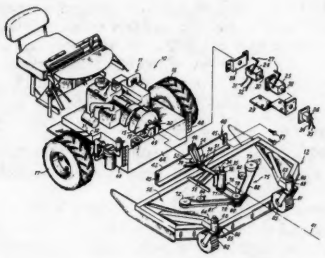
ered mower and extending rearwardly from adjacent said rear driving wheels, a connector assembly connecting together the rear end portion of said draw bar and the forward portion of said towed mower whereby said towed mower is pulled by said draw bar in trailer fashion, said connector assembly including detecting means for detecting the change of angle of trail of the towed mower with respect to said draw bar, and lifting means responsive to the detection of change of the angle of trail for adjusting the height of the forward portion of said towed mower.

4,876,846

MOWER WITH TANDEM PUMPS

Robert M. Torras, St. Simons Island, Ga., assignor to Kut Kwick Corporation, Brunswick, Ga.

Filed Oct. 2, 1986, Ser. No. 914,712
Int. Cl.[4] A01D *34/66, 34/80*
U.S. Cl. 56—11.9 **19 Claims**



1. A self propelled mower comprising a power unit and a cutter unit,

said power unit including a chassis, an operator's seat mounted on said chassis, driving wheels mounted on opposite sides of said chassis for supporting said power unit and for moving the power unit along the ground surface in forward and rearward directions, and fluid driven wheel motor means in driving relationship with respect to said driving wheels,

said cutter unit being positioned in front of said power unit and including a housing, at least one cutter blade rotatably supported about an upwardly extending axis in said housing, a fluid driven cutter blade motor supported by said housing in driving relationship with respect to said cutter blade, and support wheels mounted at opposite sides of said housing for supporting the cutter unit from the ground surface,

a pivot mounting means connecting said power unit and said cutter unit, said pivot mounting means forming a longitudinal pivot axis extending along the forward direction of movement of the mower about which said cutter unit can pivot with respect to said power unit and forming a substantially rigid connection between said power unit and said cutter unit with respect to the vertical and lateral directions about said pivot axis so that the mower is supported from the ground surface by the driving wheels and the support wheels.

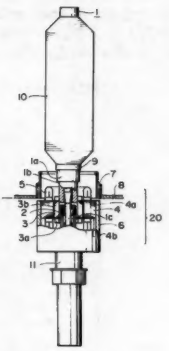
an engine and pump assembly supported by said power unit and extending from said power unit over the cutter unit, said engine and pump assembly including an internal combusion engine and at least one pump is driven relationship with respect to said engine with conduit in fluid communication between said pump and the fluid driven motor means of said wheels and of said cutter blade motor, whereby said cutter unit is pivotable with respect to the engine and pump assembly below the engine and pump assembly.

4,876,847

RING SPINNING MACHINE

Takeshi Obata, Narashino, and Hideaki Kobayashi, Sakura, both of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Jan. 22, 1988, Ser. No. 147,326
Claims priority, application Japan, Jan. 23, 1987, 62-12311
Int. Cl.[4] D01H *1/244, 7/08*
U.S. Cl. 57—100 **14 Claims**



1. A ring spinning machine including:

a bolster having an upper bearing provided in an upper portion thereof and a foot step bearing provided in a lower portion thereof;

a spindle rotatably supported by the bolster and carrying a bobbin for winding yarn thereon;

a substantially cylindrical ring having an upper end provided with a traveler for guiding the yarn to said bobbin;

a ring rail connected with a base portion of said ring and capable of moving said ring up and down in the direction of the axis of said spindle; and

a spindle motor having a motor rotor including a rotor core fixed to said spindle and secondary windings on said rotor core and a motor stator including a cylindrical stator core surrounding said rotor core leaving an annular gap therebetween and a stator winding on said stator core;

wherein said stator winding of said motor stator has an upper coil end which projects above the upper end surface of said stator core;

said upper coil end has an outside diameter smaller than the outside diameter of said stator core;

said upper bearing is disposed substantially at the center of said motor rotor; and

said ring has an inside diameter greater than the outside diameter of said upper coil end so that said ring together with said ring rail can be lowered to a level where said upper coil end is received in said ring.

8. A ring spinning machine including:

a bolster having an upper bearing provided in an upper portion thereof and a foot step bearing provided in a lower portion thereof;

a spindle rotatably supported by the bolster and carrying a bobbin for winding yarn thereon;

a generally cylindrical wharve having a first upper thick-walled portion with an inner peripheral surface connected to said spindle, a second lower thick-walled portion spaced from said spindle and an intermediate thin-walled cylindrical portion disposed between said first and second thick-walled portions;

a spindle motor having a motor rotor including a rotor core fixed to said wharve and secondary windings on said rotor core and a motor stator including a cylindrical stator core surrounding said rotor core leaving an annular gap therebetween and a stator winding on said stator core;

wherein said rotor core is fixed to an outer peripheral surface of said intermediate thin-walled cylindrical portion.

4,876,848

FIBER OPENING DEVICE HAVING FIBER CLEARING SUCTION TUBE

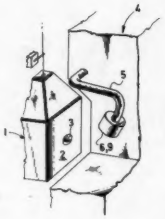
Josef Vitak, Liberec, and Frantisek Burysek, Usti nad Orlici, both of Czechoslovakia, assignors to Vyzkumny ustav bavinarsky, Usti nad Orlici, Czechoslovakia

Filed Sep. 1, 1988, Ser. No. 239,477

Claims priority, application Czechoslovakia, Sep. 2, 1987, 6375-87

Int. Cl.[4] D01H *7/885, 7/888*

U.S. Cl. 57—301 **3 Claims**



1. A fiber opening device for a spinning unit of open-end-rotor spinning machines, having a row of spinning units arranged next to each other, such spinning unit including a fiber opening housing having a cleaning hole, said housing communicating via said cleaning hole with an ejecting duct merging into an impurity withdrawing duct which has, on the one hand, an outlet opening connected to a central impurity withdrawing conduit provided in the machine frame along the spinning units, and, on the other hand, an atmospheric air inlet provided in the front wall of the fiber opening housing, and comprising in combination an automatic travelling service unit having a sucking tube, said air inlet being selectively coupled to said sucking tube of the travelling automatic service unit; said sucking tube being pivotally mounted on said service unit, said tube being provided with a free end having a self-adjustable sealing head slidably movably mounted over a predetermined distance on said tube and having a front sealing surface adapted to sealingly engage said front wall of the fiber opening housing, said head having in its interior a partially spherical concave surface which surrounds the free end of said tube and which fits onto a mating, partially spherical convex surface disposed at the end of said sucking tube.

4,876,849

GAS TURBINE PROPULSION UNIT WITH A GAS GENERATOR

Hermann Klingels, Munich, Fed. Rep. of Germany, assignor to MTU Motoren- und Turbinen-Union Munchen GmbH, Fed. Rep. of Germany

Continuation of Ser. No. 122,363, Nov. 18, 1987, abandoned. This application Feb. 28, 1989, Ser. No. 316,554

Claims priority, application Fed. Rep. of Germany, Nov. 20, 1986, 3639684

Int. Cl.[4] F02C *3/10*

U.S. Cl. 60—39.161 **19 Claims**

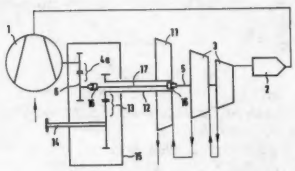
1. A gas turbine power plant, comprising a gas generator unit and power output means, said gas generator unit including:

gas generator compressor means,

combustion chamber means,

gas generator turbine means drivingly coupled with the gas generator compressor means, said gas generator turbine means including at least two turbine stages with ceramic turbine blade parts,

and gas generator transmission means drivingly connecting the gas generator turbine means to the compressor means independently of said power output means, said gas generator means exhibiting a predetermined transmission ratio



providing a speed-up of the compressor means as compared to the gas generator turbine means whereby the gas generator turbine means can be operated at relatively low speeds with consequent reduction in centrifugal force induced stress while still permitting optimal rotational speeds and efficiencies of the compressor means and gas generator turbine means.

4,876,850

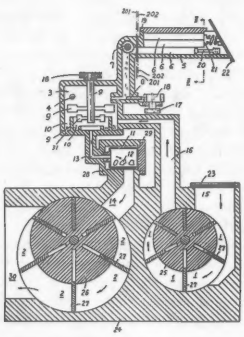
COMBUSTION ENGINE FOR SOLID BLOCK FUEL

Karl Eickmann, 2420 Isshiki, Hayama-machi, Kanagawa-ken, Japan

Continuation-in-part of Ser. No. 799,663, Nov. 14, 1985, abandoned, and a continuation-in-part of Ser. No. 803,035, Nov. 29, 1985, abandoned, which is a continuation-in-part of Ser. No. 531,513, Sep. 9, 1983, which is a continuation-in-part of Ser. No. 224,772, Jan. 1, 1981, abandoned. This application Aug. 19, 1987, Ser. No. 107,460

Int. Cl.[4] F02C *3/28*

U.S. Cl. 60—39.464 **5 Claims**



1. A combustion engine, comprising, in combination, at least one compressor in communication with at least one combustion chamber, said combustion chamber in communication with at least one expander, while said expander drives said compressor and has an output means for the supply of power out of said combustion engine; a fuel supplied into said combustion chamber and subjected therein to burn at least partially in the compressed hot air which flows from said compressor to and through said combustion chamber and said expander when the moveable parts of said compressor and expander move under the forces of the expanding gases in said expander;

wherein a fuel supply arrangement is provided and said fuel supply arrangement comprises, in combination a fuel container with a storage space, a transfer mechanism and

longitudinally straight rigid fuel bars of equal cross sectional configuration throughout their entire lengths in said storage space,

wherein said transfer mechanism includes a linearly moving member,

wherein said linearly moving member touches at least one of said fuel bars to move the respective fuel bar forward in a linear direction towards a smasher device in front of said respective fuel bar to powderize the front end of said respective fuel bar to powder in a permanently continuing operation,

wherein a fuel powder transfer device is provided between said smasher device and said combustion chamber for the transfer of the pulverized fuel from said smasher device to and into said combustion chamber, and;

wherein a plurality of said fuel bars are provided side by side with an outer face of one of said fuel bars meeting an outer face of a neighboring fuel bar to prevent the presence of excessive air between said fuel bars.

4,876,851

INFRARED RADIATION SCREENING DEVICE

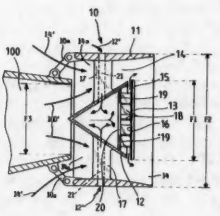
Werner Mueller, Pullenhofen, Fed. Rep. of Germany, assignor to Messerschmitt-Boelkow-Blohm GmbH, Munich, Fed. Rep. of Germany

Filed Mar. 24, 1988, Ser. No. 173,193

Claims priority, application Fed. Rep. of Germany, Apr. 11, 1987, 3712328

Int. Cl.[4] F02K *1/38*

U.S. Cl. 60—264 **6 Claims**



1. An apparatus for shielding infrared emissions of an operating engine for hindering IR-detection, comprising an outer gas guiding ring (**11**), pivotable link means (**10***a*) for adjustably attaching said gas guiding ring to an exhaust outlet (**100**) of said engine, a conical core structure (**12**) arranged essentially in a concentrical position within said gas guiding ring (**11**) for forming a cooling air channel (**14, 14'**) with an ejector effect between said exhaust outlet and said gas guiding ring and between said gas guiding ring and said conical core structure, a cover plate (**13**) secured to a large downstream directed end of said conical core structure for covering said large downstream directed end of said conical core structure, said engine exhaust outlet forming with an upstream end of said outer gas guiding ring a ring inlet for feeding cooling air into said cooling air channel having said ejector effect, strut means (**17**) for supporting said conical core structure and said cover plate in said concentrical position within said gas guiding ring, said gas guiding ring, said conical core structure, said cover plate, and said strut means being made of a carbon-fiber-carbon composite material having a high temperature resistance to form an integral unit which is position adjustable.

4,876,852

DIESEL INTERNAL COMBUSTION ENGINE WITH AN EXHAUST GAS LINE SYSTEM

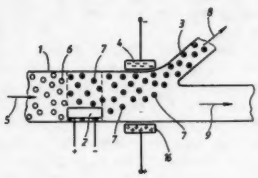
Joerg Abthoff, Pluederhausen; Hans-Dieter Schuster, Schorndorf; Hans-Joachim Langer, Remseck; Erwin Strohmer, Berglen; Rolf Gabler, Waiblingen, and Roland Schulte, Korb, all of Fed. Rep. of Germany, assignors to Daimler-Benz Aktiengesellschaft, Stuttgart, Fed. Rep. of Germany

Filed Mar. 31, 1988, Ser. No. 176,279

Claims priority, application Fed. Rep. of Germany, Apr. 3, 1987, 3711312

Int. Cl.[4] F01N *3/02*

U.S. Cl. 60—275 **4 Claims**



1. An exhaust gas line system for a diesel internal combustion engine comprising ionizing means in the course of the exhaust gas line system for ionizing soot particles taken along in the exhaust gas stream, separating means downstream of the ionizing means for separating the soot particles out of the exhaust gas stream, the means for ionizing the soot particles being constructed as light source means emitting ultraviolet light in a wavelength range between about 10 nm and 400 nm,

wherein a soot particle line branches off from the exhaust gas line system downstream of the ionizing means, and wherein within the area upstream of the branching place, an electric field is built up in which the soot particles are deflected in the direction of the soot particle line, and

wherein the exhaust gas line system within the area upstream of the branching consists of an electrically non-conductive material.

4,876,853

TANDEM MASTER CYLINDER WITH BOOSTER PISTON AT PEDAL-REMOTE END OF MASTER CYLINDER AND WITH BOOSTER-PRESSURE RESPONSIVE RESERVOIR VALVE FOR FORWARD BRAKE CIRCUIT

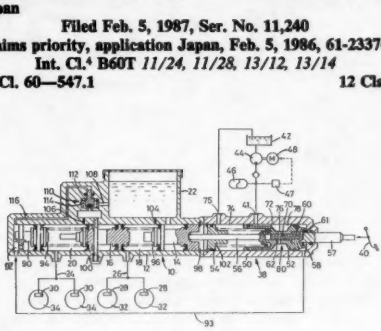
Kenji Shirai, Mishima, and Yoshihisa Nomura, Toyota, both of Japan, assignors to Toyota Jidosha Kabushiki Kaisha, Toyota, Japan

Filed Feb. 5, 1987, Ser. No. 11,240

Claims priority, application Japan, Feb. 5, 1986, 61-23376

Int. Cl.[4] B60T *11/24, 11/28, 13/12, 13/14*

U.S. Cl. 60—547.1 **12 Claims**



1. A combination including a tandem master cylinder and a booster, said master cylinder having a first housing, a first and

a second presser piston which are disposed in tandem in the first housing such that the first and second presser pistons are movable independently of each other and cooperate with the first housing to define a first and a second pressure chamber which are formed in front of said first and second presser pistons, respectively, said booster having a second housing, a first power piston cooperating with the second housing to define a first power chamber, said first power piston being advanced by a fluid pressure in said first power chamber, so as to advance said first presser piston, said booster further having a booster valve which is operated due to relative movement between said first power piston, and an operating member for operating said booster, said booster valve being operable to control the fluid pressure in said first power chamber according to an operating force applied to said operating member, wherein the improvement comprises:

a third housing,

a second power piston disposed in said third housing and cooperating with the third housing to define a second power chamber, said second power piston having opposite pressure-receiving faces one of which receives a fluid pressure in said second pressure chamber, the other pressure-receiving face receiving a fluid pressure in said second power chamber, said second power piston being operable to control the fluid pressure in said second pressure chamber according to the fluid pressure in said second power chamber;

a fluid passage for connecting said second power chamber and said first power chamber;

a reservoir for storing a working a working fluid under an atmospheric pressure;

a compensating passage formed so as to effect communication between said second pressure chamber and said reservoir, at least when said second pressure piston is in a retracted position thereof; and

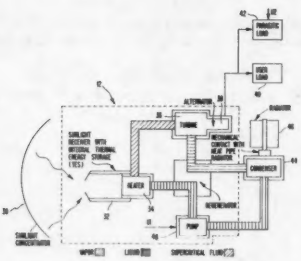
shut-off means operable so as to normally hold said compensating passage open, and shut-off said compensating passage when the fluid pressure in said second power chamber exceeds a predetermined limit.

4,876,854

SOLAR ENERGY THERMALLY POWERED ELECTRICAL GENERATING SYSTEM

William R. Owens, Rockford, Ill., assignor to Sundstrand Corp., Rockford, Ill.

Filed May 27, 1988, Ser. No. 199,459
Int. Cl.[4] F03G *7/02*
U.S. Cl. 60—641.8 **13 Claims**



1. A solar energy thermally powered electrical generating system having a thermal energy storage medium which stores a variable quantity of heat which should not exceed a maximum quantity of heat in which solar energy is absorbed by the thermal storage medium during periods of insolation and is released during periods of eclipse comprising:

(a) a thermally powered electrical generating system, thermally coupled to the thermal energy storage medium, for generating electrical energy from thermal energy stored in the thermal energy storage medium which is variable in magnitude in accordance with a first control signal;

(b) means for varying the rate of generation of electrical energy by the electrical generating system as a function of a scheduled demand of electrical power to be consumed by an electrical load coupled to the electrical generating system; and

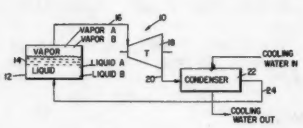
(c) control means, coupled to the thermally powered electrical generating system and to the means for varying the rate of generation, for generating the first control signal to control the rate of electrical power generation from the thermal energy stored in the thermal energy storage medium and to provide stored thermal energy to meet the scheduled demand of electrical power during periods of eclipse and to prevent the storage of an amount of thermal energy during periods of insolation exceeding the maximum quantity of heat.

4,876,855

WORKING FLUID FOR RANKINE CYCLE POWER PLANT

Amnon Yogev, Rehovot, and David Mahlab, Yavne, both of Israel, assignors to Ormat Turbines (1965) Ltd., Yavne, Israel

Filed Jan. 8, 1986, Ser. No. 817,130
Int. Cl.[4] F01K *25/06, 25/08*
U.S. Cl. 60—651 **11 Claims**



1. A method for increasing the thermodynamic efficiency of a Rankine cycle power plant of the type that employs an organic working fluid, such as a hydrocarbon or a halogenated derivative thereof, and that has a boiler for vaporizing the working fluid, a turbine responsive to vaporized working fluid produced by the boiler and producing power and heat depleted working fluid, and a condenser for condensing the heat depleted working fluid and producing condensate that is returned to the boiler, said method comprising the step of adding water to the organic fluid such that most of the liquid in the boiler is water and most of the vapor in the turbine is the vaporized organic fluid.

4,876,856

HEAT EXCHANGING SYSTEM

Naotsugu Iishiki, Tokyo; Shigetou Okano, Kashiwa, and Shiro Mishima, Kamagaya, all of Japan, assignors to Yamato Kosan Co., Ltd., Ichikawa, Japan

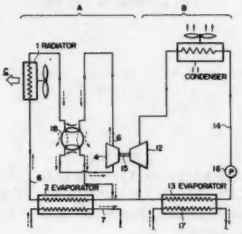
PCT No. PCT/JP87/00316, § 371 Date Mar. 16, 1988, § 102(e) Date Mar. 16, 1988, PCT Pub. No. WO87/07360, PCT Pub. Date Dec. 3, 1987
PCT Filed May 19, 1987, Ser. No. 144,922
Claims priority, application Japan, May 19, 1986, 61-113979; Oct. 29, 1986, 61-257584; Feb. 20, 1987, 62-37247; Feb. 20, 1987, 62-37246; Mar. 6, 1987, 62-51544
Int. Cl.[4] F25B *27/00*
U.S. Cl. 60—671 **7 Claims**

1. A heat changing system, which comprises:

a heating cycle part and a thermal power cycle part wherein the heating cycle part includes a first radiator, a first evaporator, and a compressor in a heating medium circulation line connecting said first radiator and said first evaporator, said compressor being driven by said thermal power cycle part, wherein said thermal power cycle part comprises a second condenser, a second evaporator, and a

turbo-engine in a thermal power medium circulation line connecting said second condenser and said second evaporator, an output shaft of said turbo-engine being connected with said compressor;

a constant heat source heater provided to heat said second evaporator in said thermal power medium circulation line;



means for generating an air current which flows concurrently through said radiator and said second condenser; and

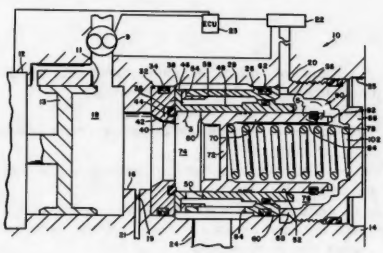
means for generating air currents which flow through said radiator and said and second condenser separately.

4,876,857

SHUT OFF/PRESSURE REGULATING VALVE FOR TURBINE ENGINE

Kevin L. Feltz, New Carlisle; Glenn A. Richardson, and Jonathan C. Burrell, both of South Bend, all of Ind., assignors to Allied-Signal Inc., Morristown, N.J.

Filed Aug. 15, 1988, Ser. No. 233,106
Int. Cl.[4] F02C *7/232*
U.S. Cl. 60—734 **7 Claims**



1. A shut off and pressure regulator valve for use with a metering valve in a fuel system for a turbine engine, comprising:

a housing having a bore therein with an inlet port connected to receive operational fuel under pressure, a control port connected to receive control fuel and an outlet port connect to provide said turbine with operational fuel, said bore having a shoulder located between said inlet and outlet ports;

a seat member located adjacent said shoulder and having a first face with an annular groove;

a first seal member located in said annular groove;

a sleeve member located in said bore having a flange on a first end that retains said first seal member in said annular groove and a ramp on a second end, said sleeve member having a plurality of radial openings, through which said bore is connected to said outlet port;

a piston located in said sleeve for separating said bore into a control chamber and a supply chamber, said piston having a first end exposed to said operational fuel in said supply chamber and a second end exposed to control fuel in said control chamber, said piston responding to a pressure differential between said operational fuel and control fuel by moving to allow operational fuel to flow through, said radial openings in said sleeve to said outlet port, said piston having a peripheral groove adjacent said second end;

a second seal member located in said peripheral groove;

an end cap fixed to said housing for engaging said sleeve member to hold said seat member against said shoulder; and

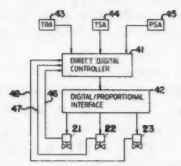
resilient means located between said end cap and piston for urging said first end of said piston toward said seat member in opposition to said pressure differential, said resilient means overcoming a predetermined pressure differential by initially moving said first end of said piston past said radial openings in said sleeve to substantially terminate communication of operational fluid to said outlet port and thereafter moving said second seal member into engagement with said ramp on said sleeve, said second seal member moving down the ramp to prevent fluid communications of control fuel from said control chamber to said outlet port along a first flow path crated by the operational clearance between said piston and sleeve, said first end of said piston moving into engagement with said first seal member to prevent communication of operational fuel to said outlet port along a second flow path created by the operational clearance between said piston and sleeve to thereafter totally interrupt communication of fuel to said outlet port and correspondingly said turbine engine.

4,876,858

AIR CONDITIONER AND METHOD OF DEHUMIDIFIER CONTROL

Allan Shaw, and Russell E. Luxton, both of 5th Floor, Security House, 233 North Terrace, Adelaide, Australia, assignors to Allan Shaw; Russell Estcourt Luxton and Luminis Pty. Ltd., all of Adelaide, Australia

Filed Nov. 24, 1987, Ser. No. 124,876
Claims priority, application Australia, Nov. 24, 1986, PH9126
Int. Cl.[4] F25D *17/06;* F25B *41/04*
U.S. Cl. 62—93 **2 Claims**



1. An air conditioner comprising a dehumidifier, said dehumidifier comprising a plurality of coil portions,

coolant supply means, conduits connecting the dehumidifier and coolant supply means in a coolant circuit, an air flow fan, means coupling the air flow fan and the dehumidifier such that the fan, in operation, causes air flow through at least some of the coil portions, at least one sensor downstream of the dehumidifier,

valve means selectively controlling flow of coolant from the supply means through the coil portions, and valve coupling means coupling the valve means thereby reducing heat transfer of that portion, but flow through the remainder of the coil portions remains sufficient to maintain dehumidification, said valve means comprising some at least of a plurality of valves which are electrically operated throttle valves,

a further sensor downstream of said air flow fan,

air flow speed control means, and

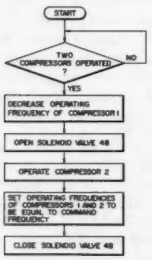
said further sensor being an air flow sensor, and means so interconnecting said electronic circuit, air flow sensor and air flow speed control means that, if air flow speed reduces to an insufficient ventilation velocity pursuant to load reduction, air flow speed is again increased by a preset signal from the control system which resets the supply air thermostat to a higher temperature thus decreasing the enthalpy difference across the coil condition curve and causing the air dampers associated with each zone to take corrective action by moving to more open positions and thus to increase the volume flow rate of the fan to result in sufficient ventilation.

4,876,859

MULTI-TYPE AIR CONDITIONER SYSTEM WITH STARTING CONTROL FOR PARALLEL OPERATED COMPRESSORS THEREIN

Manabu Kitamoto, Fuji, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Jul. 28, 1988, Ser. No. 225,483
Claims priority, application Japan, Sep. 10, 1987, 62-227311
Int. Cl.[4] F25B *7/00*
U.S. Cl. 62—117 **15 Claims**


START
TWO COMPRESSORS OPERATED ?
NO
YES
DECREASE OPERATING FREQUENCY OF COMPRESSOR 1
OPEN SOLENOID VALVE 4B
OPERATE COMPRESSOR 2
SET OPERATING FREQUENCIES OF COMPRESSORS 1 AND 2 TO BE EQUAL TO COMMAND FREQUENCY
CLOSE SOLENOID VALVE 4B

1. A multi-type air conditioner apparatus, comprising:

an outdoor unit having at least two variable-capacity compressors, an outdoor heat exchanger to which said two compressors are commonly coupled, and bypass means including a solenoid valve between a refrigerant intake side and a delivery side of one of said variable-capacity compressors;

a plurality of indoor units, each having at least an indoor heat exchanger and detecting means for detecting an air condition load of said indoor heat exchanger, to output required capacity data;

a distribution unit for coupling said outdoor unit in parallel with said plurality of indoor units, so as to constitute each refrigerant cycle, said distribution unit having a plurality of refrigerant flow control means for each refrigerant cycle;

first control means, for supplying a control command based on required capacity data from said plurality of indoor units to said refrigerant flow control means of said distribution unit, and outputting total sum data of the respective required capacity data;

second control means, for supplying a single operation command with a predetermined capacity by one of said two variable-capacity compressors to said outdoor unit when said total sum data from said first control means is smaller than a predetermined value, and supplying a parallel operation command with predetermined capacities by both said two variable-capacity compressors to said outdoor unit when the total sum data is larger than said predetermined value; and

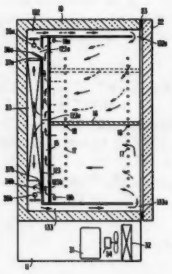
third control means, for supplying a command for setting said solenoid valve in an open state for temporarily decreasing from said predetermined capacity one of said two variable-capacity compressors to said outdoor unit and thereafter supply a command for starting another of said two variable-capacity compressors to said outdoor unit when said single operation command supplied from said second control means is switched to a parallel operation command, thus allowing said another of said two variable-capacity compressors to start while the operation frequency of said one compressor is decreased.

4,876,860

REFRIGERATOR WITH VARIABLE VOLUME INDEPENDENTLY COOLED STORAGE CHAMBERS

Kozaburo Negishi, Isesaki, Japan, assignor to Sanden Corporation, Gunma, Japan

Filed May 31, 1988, Ser. No. 200,733
Int. Cl.[4] F25D *17/06*
U.S. Cl. 62—179 **12 Claims**



1. A refrigerator with at least two variable volume, independently cooled storage chambers comprising:

a cabinet with a front opening;

a door element hinged on said cabinet to normally close the front opening;

an inner separation member disposed within the cabinet to define a storage space;

one or more adjustable partitions for dividing said storage space into at least two variable volume, independently cooled storage chambers;

flow control means associated with each variable volume, independently cooled storage chamber for controlling air flow into each of said variable volume, independently cooled storage chambers;

connecting hole means formed through said inner separation member for allowing air flow from said variable volume, independently cooled storage chambers;

refrigerating means comprising an evaporator disposed adjacent to said connecting hole means to cool air from the variable volume, independently cooled storage chambers so that air from each variable volume, independently cooled storage chamber can be cooled by flowing through said connecting hole means and over said evaporator; and

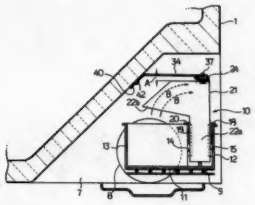
an air flow space formed by disposing said inner separation member within the cabinet with a gap between said inner separation member and the cabinet so that air cooled by flowing over said evaporator can selectively flow under control of said flow control means through the air flow space and selectively into each of the variable volume, independently cooled storage chambers.

4,876,861

DEFROST-WATER VAPORIZER OF A REFRIGERATOR

Hiroshi Tanaka, Hirakata; Yasukiyo Murata, and Kazumi Eto, both of Ibaraki, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Jan. 19, 1989, Ser. No. 298,963
Claims priority, application Japan, Jan. 20, 1988, 63-10213; Mar. 14, 1988, 63-34168[U]
Int. Cl.[4] F25B 47/00
U.S. Cl. 62—279 6 Claims



1. A defrost-water vaporizer of a refrigerator including a heat-insulated cabinet having a storage space at the interior and provided with an evaporator, a machine compartment provided at the outside of the heat-insulated cabinet so as to have a surface open to the atmosphere, a compressor mounted in the machine compartment for supplying the evaporator with refrigerant, and a defrost-water vaporizer provided in the machine compartment, the defrost-water vaporizer comprising:

(a) a water reservoir provided in the machine compartment for receiving defrost water resulting from the melting of frost adherent to the evaporator to be discharged outside the storage space of the heat-insulated cabinet;

(b) a plurality of vaporizing elements each having a lower portion inserted in the water reservoir so as to come into contact with the defrost water in the water reservoir and an upper portion disposed higher than the compressor, the vaporizing elements absorbing the defrost water in the water reservoir by capillarity to thereby vaporize the absorbed water from the surfaces thereof; and

(c) a lower support formed from an elastic material and provided between the lower portion of each vaporizing element and the inner surface of a side wall of the water reservoir, the lower support supporting the vaporizing elements in the water reservoir.

4,876,862

CONTROL DEVICE FOR THREADING TUBES IN CROCHET GALLOON LOOMS

Luigi O. Zorini, Cilavegna, Italy, assignor to Comez S.P.A., Cilavegna, Italy

Filed Jul. 19, 1988, Ser. No. 221,128
Claims priority, application Italy, Jul. 21, 1987, 22047/87[U]
Int. Cl.[4] D04B 23/00
U.S. Cl. 66—207 3 Claims

1. A control device for threading tubes in crochet galloon looms, comprising:

a thread guide rail provided with an oscillatory motion;

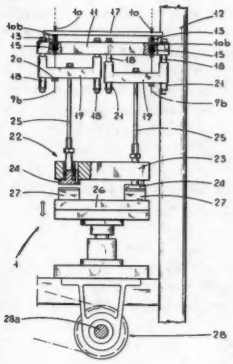
a number of threading tubes oscillatably supported by the thread guide rail and individually translatable with respect to said rail against the action exerted by respective first return springs;

a number of actuation cables each of them having one end connected to one of said threading tubes;

a number of sheaths each slidably engaging one of said actuation cables and having one end fixedly fastened with respect to the thread guide rail and the second end engaged with a fixed support;

a number of control plates each engaging at least one of said actuation cables at a second end thereof and being provided with a to-and-fro translation movement with respect to said fixed support in order to cause, through said actuation cables, the translations of said threading tubes against the action of said first return springs;

control means to selectively translate the control plates in synchronism with the movements of said thread guide rail,



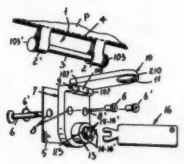
which device further comprises a number of second return springs each of them having a greater stiffness than the first return springs and acting between a shoulder formed in said fixed support and a locating element fastened to the second end of one of said sheaths, the length of each sheath being greater than the distance between the opposed ends thereof.

4,876,863

LOCK PARTICULARLY ADAPTED FOR BAGS, BRIEF-BAGS, OR THE LIKE

Pietro Mannato, Bologna, Italy, assignor to Finduck S.r.l., Bologna, Italy

Filed Jul. 7, 1988, Ser. No. 215,969
Claims priority, application Italy, Jul. 8, 1987, 15204/8 [U]
Int. Cl.[4] E05B 65/52
U.S. Cl. 70—64 4 Claims



1. A lock for a bag having a closure flap to be secured to said bag, said lock comprising:

(a) a slot (1) adjacent an edge of said closure flap (P);

(b) a supporting platelet (7) attached to said bag (F);

(c) a rotatable locking barrel (13) projecting from a front side of said platelet (7) and having at least one lateral projection (14—14') at a free end of said barrel, with side recesses (15, 15') in said free end, and a matching key (16) engageable in said side recesses for rotating said locking barrel;

(d) a latch member (10) pivotally hinged to an end (107) of said platelet (7) turned toward said closure flap (10), said latch member having a circular opening (11) diameter corresponds to the diameter of a free end (113) of said locking barrel (13), said opening having at least one recess

(12, 12') mating with said at least one lateral projection (14, 14') on said locking barrel;

(e) wire fork spring means (20, 21) attached to a rear side of said platelet (7), for stabilizing said locking barrel (13) in a first angular position in which said at least one lateral projection (14, 14') coincides with said at least one recess (12, 12'), and in at least another angular position in which said at least one lateral projection is angularly offset relative to said at least one recess, said locking barrel (13) having a stepped rear end (213) rotatably passing through said platelet (7) and axially retained by said wire fork spring means (21), said wire fork spring means having ends engaged in an annular groove (18) formed in said rear end (213) of said locking barrel (13);

(f) a bottom of said annular groove (18) being provided with angularly equispaced, secant flattened portions (20), said ends of said fork spring means (21) bearing against said bottom of said annular groove;

(g) whereby said latch member (10) can be passed through said slot (1) in said closure flap (P) and fitted on said locking barrel (13) by means of said opening (11), and secured to said locking barrel by rotating said locking barrel (13) to angularly offset said at least one lateral projection (14, 14') relative to said at least one recess (12, 12') and to place said at least one projection on said latch member (10).

4,876,864

COMBINATION LOCK

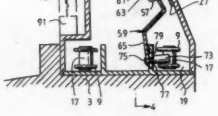
Christopher D. Sassella, Lower Plenty, Australia, assignor to Dowell Australia Limited, Victoria, Australia

Filed May 6, 1988, Ser. No. 190,811

Claims priority, application Australia, May 13, 1987, PI1892

Int. Cl.[4] E05B *37/02;* E05F *11/04*

U.S. Cl. 70—89 **8 Claims**



1. A combination lock for a panel and a frame assembly where said panel can move relative to said frame, said panel having a chain winding mechanism and an arm member extending therefrom which can be used to hold said panel in a closed condition, said combination lock comprising combination locking means and an engaging member operated thereby, said engaging member being for releasably preventing said arm member from moving so as to inhibit opening of said panel, said arm member being a chain of said chain winding mechanism for a swing-out window and said combination lock being fitted within a housing of said chain winding mechanism, said engaging member being movable into engagement with said chain within said housing for releasably preventing said chain from moving so as to inhibit opening of said panel.

4,876,865

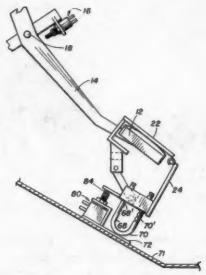
AUTOMOBILE ANTI-THEFT, BRAKE-LOCKING DEVICE

Antonio Trinidad, HC-763 B2N.3321, Patillas, P.R. 00723; Victor M. Zayas Luna, Box 674, Arroyo, P.R. 00615, and Miguel A. Rey, Urb. Valle Alto; Calle 4E-18, Patillos, P.R. 00723

Filed Jul. 27, 1988, Ser. No. 224,815

Int. Cl.[4] B60R *25/00*

U.S. Cl. 70—203 **10 Claims**



1. An anti-theft device for vehicles for use in retaining the brake pedal of the vehicle in its depressed, brake-engaging state to prevent the movement of the vehicle, comprising:

brake-pedal engaging means for contacting a brake pedal of a vehicle which is to be mad theft-proof;

means operatively engaged with said brake-pedal engaging means for retaining said brake-pedal engaging means in a first state thereof representative of the depression of the brake pedal engaged by said brake-pedal engaging means so that the brake pedal is in its downward, braking state for braking the wheels of the vehicle;

said brake-pedal engaging means comprising a first upper plate member contacting a surface portion of a brake pedal of a vehicle, and a second plate member, means for pivotally connecting said first and second pate members together to allow for relative rotation therebetween, a pair of spaced apart retaining means for sandwiching therebetween a portion of an operating brake lever of a vehicle, said pair of retaining means projecting downwardly from said first plate member, and means for locking said first and second plate members together to prevent relative rotation therebetween, so that said brake-pedal engaging means is fixedly locked to a brake pedal.

4,876,866

DOOR LATCH AND DEADBOLT ASSEMBLY

Paul D. Fleming, Glendale, and David L. O'Day, Canoge Park, both of Calif., assignors to W & F Manufacturing, Inc., Glendale, Calif.

Division of Ser. No. 12,434, Feb. 9, 1987, Pat. No. 4,784,417, which is a division of Ser. No. 825,053, Jan. 31, 1986, Pat. No. 4,671,089. This application Aug. 22, 1988, Ser. No. 216,956

Int. Cl.[4] E05B *3/08*

U.S. Cl. 70—379 R **3 Claims**

1. A door latch mechanism, comprising:

a latch case;

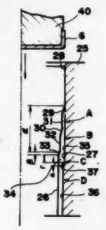
a latch slidably supported within said case for movement between an advanced position projecting from said case and a retracted position substantially within said case;

spring means for urging said latch normally toward said advanced position;

a latch retractor having one end connected to said latch, said latch retractor having a yoke-shaped opposite end defining a pair of spaced legs, at least one of said legs being

twisted out of the plane of said retractor adjacent said latch to define a twisted tab cam follower; and

a cam sleeve rotatably supported adjacent said twisted tab



cam follower and having a cam lobe engageable therewith upon rotation of said cam sleeve to move said latch retractor in a direction displacing said latch toward said retracted position.

4,876,867

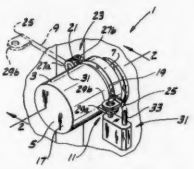
DOOR LOCK

William H. Leneave, R.R. 1, Box 39, Dix, Ill. 62830

Filed Aug. 18, 1988, Ser. No. 234,026

Int. Cl.[4] E05B *17/14*

U.S. Cl. 70—428 **4 Claims**



1. A door lock adapted for placement on a door handle having a knob with a front face having a keyhole therein, said door lock comprising

a tubular casing substantially closed at one end by an end wall member and open at its other end for enabling the casing to be placed on the handle in a position wherein the knob is disposed in the casing with its front face adjacent said end wall member, said tubular casing having an inside radial dimension sufficient to permit the casing to rotate freely on the knob,

no more than one circumferential slot generally adjacent the open end,

a locking lever pivotably connected to the casing adjacent one end of the slot to permit the lever to swing in a plane extending generally radially with respect to the casing between a non-obstructing position wherein the casing may be placed on the door handle and removed from the door handle, and an obstructing position wherein the lever is received in the slot and extends across the interior of the casing obstructing the open end of the casing, the lever being engageable by the knob when the casing is on the handle and the lever is in said obstructing position for preventing the casing from being pulled off the handle, and

locking means for locking the lever in said obstructing position whereby, when the casing is on the door handle, the knob cannot be turned and said substantially closed end wall member prevents a key from being inserted into the keyhole.

4,876,868

METHOD FOR FORMING AN OBJECT OF METAL BY COLD PRESSING

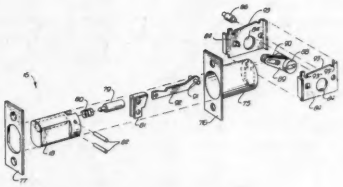
Hans-Joachim Tüshaus, Hanau, and Michael Hörmann, Möbris, both of Fed. Rep. of Germany, assignors to W. C. Heraeus GmbH, Hanau, Fed. Rep. of Germany

Filed Jan. 25, 1989, Ser. No. 301,808

Claims priority, application Fed. Rep. of Germany, Feb. 13, 1988, 3804567

Int. Cl.[4] B21C *23/32, 23/20;* B21J *3/00*

U.S. Cl. 72—42 **7 Claims**



1. Method for making a body from a metal from the group consisting of tantalum, niobium and a base alloy of one of these metals comprising:

applying to a metal slug a lubricant film which consists of an oxide coating of said metal, embedding at least one of polytetrafluorethylene of low molecular weight and chlorotrifluorethylene in said metal oxide coating, and then cold forming the metal slug by forcing a hard-metal punch in a single step into said slug to shape said body by backflow pressing, the punch having a shank and a head provided with a crowned bottom surface and a rounded undercut in an area of transition between said punch head and said punch shank.

4,876,869

INNER GROOVING PROCESS FOR A METALLIC TUBE

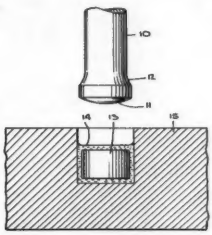
Chikara Saeki, Hatano, and Minoru Nishibe, Kobe, both of Japan, assignors to Kabushiki Kaisha Kobe Seiko Sho, Kobe, Japan

Filed Jun. 30, 1988, Ser. No. 214,054

Claims priority, application Japan, Jul. 7, 1987, 62-169571

Int. Cl.[4] B21C *3/08, 37/06;* B21D *53/06, 17/04*

U.S. Cl. 72—68 **3 Claims**



1. An inner grooving process for a metallic tube wherein a metallic tube is reduced in diameter by means of a drawing die and a floating plug and is then grooved on an inner wall thereof by means of a rolling member supported on a retaining ring and a grooved plug whereafter the diameter of the metallic tube is adjusted by means of a diameter adjusting die, and wherein said drawing die has an exit hole of a fixed diameter

while said floating plug comprises a plug having no bearing portion thereon, which comprises:

connecting said floating plug and said grooved plug for rotation, said grooved plug having an outer diameter smaller than the diameter of said exit hole of said drawing die;

inserting said floating plug and said grooved plug into said metallic tube upstream of said drawing die;

drawing said grooved plug while within said metallic tube through said drawing die to a predetermined location of said rolling member and retaining said grooved plug at said predetermined location, whereafter said floating plug and said drawing die cooperate with each other for reducing the inner diameter of the metallic tube to a dimension smaller than the outer diameter of the grooved plug; and

tube expanding rolling drawing the metallic tube with said rolling member and said grooved plug for expanding and grooving the metallic tube continuously.

4,876,870

METHOD FOR MANUFACTURING TUBES

Mauri V. Rantanen, Espoo, Finland, assignor to Outokumpu Oy, Helsinki, Finland

Filed Mar. 23, 1988, Ser. No. 172,196
Claims priority, application Finland, Mar. 26, 1987, 871344
Int. Cl.[4] B21B *19/06*
U.S. Cl. 72—78 **8 Claims**

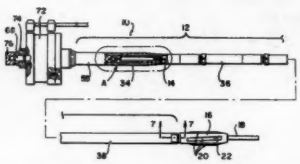
1. A method of manufacturing tubes of a non-ferrous metal, starting with a tube shell of a material consisting of copper, nickel, zirconium or titanium or their alloys at ambient temperature which tube shell has been made by continuous casting or extrusion, consisting of planetary cold rolling of the tube shell to cause an area reduction of at least 70 percent in one single pass, and because of said area reduction and resistance of the material to deformation, a temperature rise to the recrystallization temperature of the material, the grain size of the material remaining within the range of 0.005 to 0.050 mm.

4,876,871

FLEXIBLE HARDROLL MANDREL ASSEMBLY FOR SLEEVING PERIPHERALLY LOCATED HEAT EXCHANGER TUBES

Thomas E. Arzenti, Hempfield Township, and Robert D. Senger, Unity Township, both of Westmoreland County, Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Sep. 29, 1988, Ser. No. 250,737
Int. Cl.[4] B21D *39/10*
U.S. Cl. 72—122 **28 Claims**



1. A flexible hardroll mandrel assembly for expanding a sleeve comprising:

an elongate housing for transferring torque including at least one flexure means along the length thereof;

a roller cage rotatably mounted to a first end of said elongate housing, including a roller rotatably mounted within a slot in said roller cage;

a tapered actuator shaft axially slidably supported in an opening in said roller cage for radially extending, orbiting and rotating said roller;

an end effector and drive means for rotatably driving said elongate housing, and

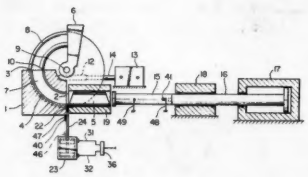
a flexible inner shaft means within said elongate housing for axially shifting said tapered actuator shaft and for translating rotational drive torque from said elongate housing to said tapered actuator shaft.

4,876,872

METHOD AND APPARATUS FOR MANUFACTURING CURVED PIPE

Toshio Kaneko, Kanagawa, Japan, assignor to Kabushiki Kaisha Asahi Kinzoku Kogyosho, Kawasaki, Japan

Filed Oct. 27, 1988, Ser. No. 263,643
Claims priority, application Japan, Oct. 28, 1987, 62-270464
Int. Cl.[4] B21D *7/08, 9/12*
U.S. Cl. 72—133 **7 Claims**



1. A curved pipe manufacturing method comprising the steps of:

(1) providing a fixed die having a curved cavity, an entrance opening and an exit opening contained therein, said curved cavity being formed in a circular arc and extending from said entrance opening to said exit opening;

(2) providing a movable block, an ejecting rod and a curved mandrel, said movable block being attached to said ejecting rod at a basal end of said ejecting rod and said curved mandrel being concentrically attached to said ejecting rod at a distal end of said ejecting rod, said ejecting rod being of greater diameter than said curved mandrel and forming a stepped surface with said curved mandrel where said curved mandrel is concentrically attached to said ejecting rod;

(3) inserting the curved mandrel into the curved cavity of the fixed die through the exit opening therein and forming a curved annular chamber inside said cavity;

(4) pressing a work with a presser rod through said entrance opening into aid curved annular chamber to form a curved pipe;

(5) turning the movable block in a first direction so that the mandrel and the curved pipe are ejected from the entrance opening of the fixed die;

(6) advancing a movable chuck provided adjacent said entrance opening to a position where said movable chuck contacts a rear end portion of said curved pipe and restrains the movement of said curved pipe in a direction opposite to said first direction;

(7) turning said movable block in said direction opposite to said first direction so as to return only the mandrel into the curved cavity of the fixed die; and

(8) retracting the ;movable chuck to recover the curved pipe.

4,876,873

ANTIROTATION METHOD TO STRAIGHTEN SECTIONS AND ANTIROTATION STRAIGHTENING MACHINE WHICH EMPLOYS SUCH METHOD

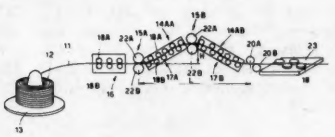
Giorgio Del Fabro, Cassacco Franz. Montegnacco, and Marcello Del Fabro, Udine, both of Italy, assignors to M.E.P. Macchine Elettroniche Piegatrici SpA, Reana Del Rojale (UD), Italy

Filed Nov. 24, 1987, Ser. No. 125,005

Claims priority, application Italy, Nov. 26, 1986, 83445 A/86; Aug. 21, 1987, 83441 A/87; Oct. 6, 1987, 83467 A/87

Int. Cl.[4] B21F *1/02*

U.S. Cl. 72—162 6 Claims



1. Antirotation method to straighten sections, comprising:

guiding the sections through a guide and prestraightener assembly to initially straighten the sections;

passing the initially straightened sections through at least two straighening assemblies, wherein each of said straightening assemblies includes multiple pairs of rolls, and each of said pairs of at least one of said straightening assemblies is positioned to form a half-loop, thereby essentially preventing rotation of the sections while the sections are straightened;

passing the sections through a linearizing assembly to form linear, straightened sections; and

passing the sections through a finishing assembly to form a finished, straightened section product, wherein the sections pass through each assembly along a sinuous path lying substantially on one single plane.

4,876,874

METHOD OF HOT ROLLING STEEL STRIP WITH DEFORMED SECTIONS

Nobuo Kakehi; Yuzuru Takahashi; Norio Higuchi; Yoshikazu Izumihara, all of Muroran; Hiromi Matsumoto, and Yuji Uehori, both of Kitakyushu, all of Japan, assignors to Nippon Steel Corporation, Tokyo, Japan

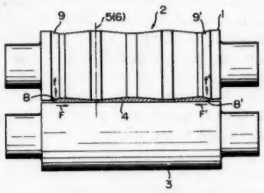
PCT No. PCT/JP87/00158, § 371 Date Nov. 13, 1987, § 102(e) Date Nov. 13, 1987, PCT Pub. No. WO87/05543, PCT Pub. Date Sep. 24, 1987

PCT Filed Mar. 12, 1987, Ser. No. 128,112

Claims priority, application Japan, Mar. 15, 1986, 61-57675; Mar. 15, 1986, 61-57676

Int. Cl.[4] B21B *1/08, 1/22, 27/02*

U.S. Cl. 72—199 5 Claims



1. A method of rolling a steel strip with deformed sections having a thickness change in the direction of the width of the steep strip, by use of a continuous, hot strip mill, said method comprising the steps of:

providing an excess metal portoion along each lateral side edge of a steel strip material to be rolled for simultaneously obtaining one or a plurality of deformed section portions;

providing, on a roll for effecting said rolling, a pair of holding portions, each portion being located at the opposite end of said roll;

positioning one of the excess metal portions at a position corresponding to one of said holding portions, each of said holding portions being constituted by a tilted surface placed in a contact-and-rolling relation to the excess metal portion, said tilted surfaces being oriented, such as to exert onto the steel material being rolled a force directed towards the center of the steel material; and,

rolling said deformed section steel strip in a plurality of reducing stages so that said forces exerted by said tiled surfaces effect a self-alignment of said strip during said rolling stages.

4,876,875

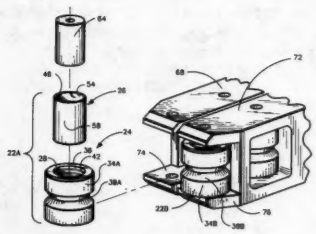
SUPPORTED CERAMIC GUIDE ROLLER

Rudyard J. Bruggeman, Arvada, and Gregory A. Carscallen, Lakewood, both of Colo., assignors to Coors Porcelain Company, Golden, Colo.

Filed Dec. 4, 1987, Ser. No. 130,109

Int. Cl.[4] B21B *27/02, 27/06, 39/14*

U.S. Cl. 72—199 19 Claims



1. A ceramic roller comprising:

an annulus-shaped member comprising a first ceramic material and having first and second side surfaces and outer and inner circumferential surfaces;

a support member comprising a second material, different from said first ceramic material and having a support surface and being positioned such that said support surface is spaced from said inner surface to define a first space therebetween, wherein at least a portion of at least one of said first side surface and said second side surface extends radially outward from said support member;

adhesive means comprising an epoxy in said first space for adhering to said inner surface and said support surface and for at least partially relieving stress on said annulus-shaped member.

4,876,876

DIES FOR FORGING GEAR-SHAPED PART MADE OF SHEET METAL

Kyoso Ishida, Hiroshima, and Shinya Kodama, Aki, both of Japan, assignors to Mazda Motor Corporation, Hiroshima, Japan

Filed Oct. 27, 1988, Ser. No. 263,250

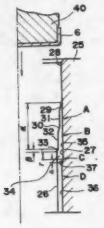
Claims priority, application Japan, Oct. 27, 1987, 62-269211; Nov. 10, 1987, 62-294509

Int. Cl.[4] B21D *22/26*

U.S. Cl. 72—348 9 Claims

1. Dies for forging a gear-shaped part made of a sheet metal, comprising a cylindrical die for forming, in cooperation with a cylindrical punch, tooth portions and bottom land portions at

a peripheral wall portion of a cup-shaped work integrally formed from the sheet metal, wherein ridges and grooves provided at the inner peripheral surface of the cylindrical die in the axial direction of the die in order to form the tooth portions and the bottom land portions are such that, in the



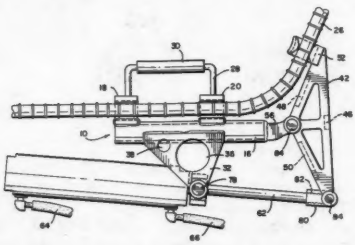
direction from an insertion-side opening of the cylindrical die toward the depth of the die, the height of the ridges is gradually increased to a final height, then the width of the ridges is gradually increased to a final width, and thereafter the depth of the grooves is gradually decreased to a final depth.

4,876,877

PORTABLE TOOL FOR BENDING ROOF BOLTS FOR INSERTION IN MINE ROOF OPENINGS

Claude C. White, Birmingham, Ala., assignor to Birmingham Bolt Company, Inc., Birmingham, Ala.

Filed Jun. 14, 1988, Ser. No. 206,362
Int. Cl.[4] B21D 9/07
U.S. Cl. 72—388 **7 Claims**



1. Apparatus for bending elongated roof bolts preparatory to insertion thereof into mine roof openings, said apparatus including

(a) a stationary support portion for holding a first part of an elongated roof bolt in a substantially horizontal plane;

(b) said stationary support portion comprising a rectilinear member, elongated in a direction parallel with the elongated roof bolt;

(c) a spaced bolt retaining member fixedly connected with said elongated rectilinear member for holding the bolt;

(d) a power cylinder and piston connected to said elongated rectangular member;

(e) a pivotally movable support portion axially aligned with said stationary support portion;

(f) said movable support portion including a triangular shaped member having sides and a base;

(g) a bolt retaining member fixedly connected with one side of said triangular shaped member;

(h) a first means for pivotally connecting said triangular shaped member, at the juncture of the sides thereof, to said elongated rectilinear member;

(i) a second means pivotally connecting said piston with said triangular shaped member at the juncture of one of the sides and the base thereof, and

(j) control means operatively connected with said cylinder and piston, said control means being actuated to a first position to move the piston to extended position, to effect rotational movement of said triangular shaped member and movable support portion in a vertical plane to effect bending of the bolt in an upward direction for insertion of the bent portion of the bolt into the mine roof opening;

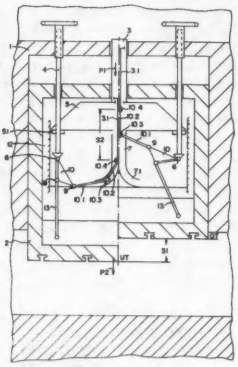
(k) said control means being moved to a second position to effect rotational movement of said triangular shaped member and movable support portion to its initial position, to effect straightening of the bolt to permit full insertion thereof into the mine roof opening.

4,876,878

PRESS WITH HYDRO-MECHANICAL DRIVE

Andrea Scheitza, Weiterstadt, Fed. Rep. of Germany, assignor to Werner Leinhaas, Gelnhausen, Fed. Rep. of Germany

Filed Mar. 23, 1988, Ser. No. 172,696
Claims priority, application European Pat. Off., Mar. 24, 1987, 87104278.4
Int. Cl.[4] B21J 9/18
U.S. Cl. 72—450 **8 Claims**



1. A cutting and reshaping press, comprising

a frame comprising a top plate, a base plate and vertical supports extending between said top plate and said base plate, said frame having a substantially hollow interior region,

a press ram comprising a top wall, a bottom wall and sidewall extending between said top wall and said bottom wall, said press ram including a substantially hollow interior region, said press ram being located within said hollow interior region of said frame and being movable relative to said frame,

adjustable suspension means connecting said top wall of said press ram to said top plate of said frame, said adjustable suspension means passing through said top wall and extending into the interior region of said press ram,

a drive system located between said top wall of said press ram and said top plate of said frame, said drive system passing through said top wall and extending into the interior region of said press ram, said drive system including a piston,

a central guide located substantially centrally of said topwall and extending into the interior region of said press ram, said piston travelling within said central guide,

a support axle located at a second end of said suspension means within the interior region of said press ram,

a bridge structure located within the interior region of said press ram and connecting said central guide to said suspension means,

first, second and third movable articulation points located within the interior region of said press ram,

first coupling means comprising first, second, and third levers connecting said support axle, said first articulation point, and said second articulation point into a rigid triangle pivotable about said support axle,

second coupling means comprising a fourth lever connecting said first articulation point to said bottom wall of said press ram, and

third coupling means comprising a fifth lever connecting said second articulation point to said third articulation point,

said third articulation point being attached to said piston and travelling within said central guide along with said piston,

wherein movement by said piston through a distance S_2 causes said press ram to move a distance S_1 relative to said frame, said distance S_1 being less than said distance S_2.

4,876,879

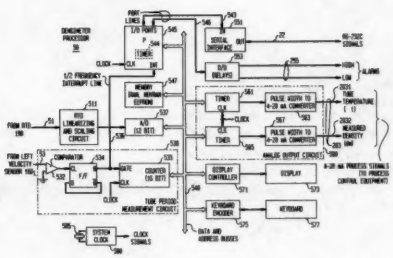
APPARATUS AND METHODS FOR MEASURING THE DENSITY OF AN UNKNOWN FLUID USING A CORIOLIS METER

James R. Ruesch, 6941 Harvest Rd., Boulder, Colo. 80301

Division of Ser. No. 235,234, Aug. 23, 1988, abandoned, which is a continuation of Ser. No. 916,780, Aug. 9, 1986, abandoned. This application Mar. 27, 1989, Ser. No. 329,181

Int. Cl.[4] G01N *9/06*; G01F *1/74*

U.S. Cl. 73—32 A **17 Claims**



1. Apparatus for a metering system which measures the density of a process fluid using a Coriolis meter having at least one flow tube which is driven to resonantly oscillate in a substantially sinusoidal manner about a bending axis while the fluid flows through said flow tube, said apparatus comprising:

means for measuring a value of a period at which said flow tube resonantly vibrates while a process fluid flows therethrough and for generating a first interrupt at the conclusion of each period value measurement;

means for measuring a temperature of said flow tube:

means for displaying a valve of density of said process fluid; and

a processing circuit comprising:

means, responsive to an occurrence of said first interrupt, for filtering said period value measurement to yield a filtered period measurement;

means for generating a second interrupt at a first predefined periodic interval of time;

means, operative in response to an occurrence of said second interrupt and to said temperature measuring means, for providing a measured temperature value of said flow tube coincidentally occurring while said process fluid flows therethrough;

means for determining, in response to the measured temperature value, a temperature coefficient value for said process fluid;

means, responsive to said temperature coefficient determining means and to said filtered period measurement, for determining a first factor as being a product of said temperature coefficient value and a square of said period value;

means, responsive to said first factor and to second and third factors associated with first and second known calibration fluids, for producing a current density value of said process fluid;

means, responsive to said current density value, for updating the displayed density value appearing on said first displaying means with said current density value at a second pre-defined periodic interval of time, wherein said second pre-defined interval is longer than said first pre-defined interval;

wherein said apparatus further comprises means for correspondingly setting each of the second and third factors substantially equal to the first factor that occurs when the first and second known calibration fluids are correspondingly and selectively passed through the flow tube as the process fluid in order to calibrate the meter.

4,876,880

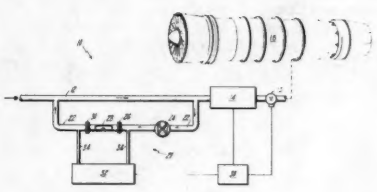
DENSIMETER

Gerald P. Dyer, Enfield, Conn., assignor to United Technologies Corporation, Hartford, Conn.

Division of Ser. No. 51,887, May 20, 1987, Pat. No. 4,809,499. This application Oct. 25, 1988, Ser. No. 262,392

Int. Cl.[4] G01N *9/00*

U.S. Cl. 73—32 R **1 Claim**



1. Apparatus for determining the density of a liquid characterized by:

means for impelling a liquid at a constant volumetric flow along a flow path;

an orifice having a fixed area disposed within said flow path, said liquid flowing through said orifice;

means for determining a pressure drop of said liquid across said orifice and for sending a signal corresponding to said determined pressure drop; and

means for receiving said signal and determining said density of said liquid as a function of said pressure drop wherein said density is equal to the pressure drop divided by a constant times said square of the volumetric flow.

4,876,881

METHOD AND APPARATUS FOR MEASURING SETTLING RATE, COMPACTION, AND CLARITY OF A LIQUID

Daniel F. Pope, Issaquah, Wash., assignor to Mt. Fury Company, Issaquah, Wash.

Filed Aug. 12, 1988, Ser. No. 231,767

Int. Cl.[4] G01N *15/04, 15/06*

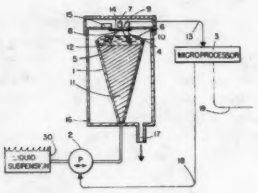
U.S. Cl. 73—53 **8 Claims**

1. In a method for determining the settling rate and percent ultimate compaction of suspended solids in a liquid sample, of the type wherein a reservoir, having an inlet port near the bottom and which will permit overflow near the top, is filled with the liquid sample and the level within the reservoir of an interface formed between the clarified and unclarified portions of the liquid sample is measured, the improvement comprising:

adjusting the rate at which additional sample is supplied to

the reservoir through the inlet port so that the interface level is maintained at a desired constant level within the reservoir;

calculating the settling rate from the necessary adjustments



to the rate at which liquid sample is supplied to the reservoir; and

calculating the percent ultimate compaction from the slowing of the settling rate as liquid sample is supplied to the reservoir.

4,876,882

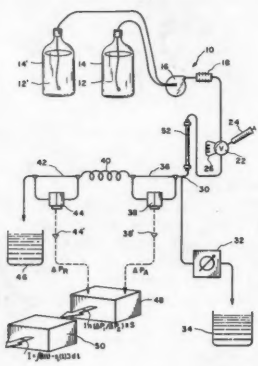
VISCOSITY DETECTION METHOD FOR LIQUID CHROMATOGRAPHY SYSTEMS WITH CARRIER LIQUIDS HAVING TIME-VARYING VISCOSITY

Wallace W. Yau, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Jan. 30, 1989, Ser. No. 302,899

Int. Cl.[4] G01N *11/08*

U.S. Cl. 73—55 **1 Claim**



1. A method for measuring the inherent viscosity of individual solute components in a multicomponent sample in solution with a solvent, comprising:

passing a stream of a carrier liquid having a viscosity which varies as a function of time at a flow rate R sequentially through (1) means for separating said sample into its individual solute components, (2) a first capillary tube and (3) a second capillary tube, which tubes are separated from each other by an offset volume ΔV, where $0<\Delta V\leqq RT$, where T is as defined below;

introducing into said stream of carrier liquid, upstream of said means for separating said sample into its individual solute components, a predetermined volume of a solution comprising the sample and the solvent, whereby said sample is separated into its individual solute components;

measuring, as a function of time, pressure differences $\Delta P_1(t)$ and $\Delta P_2(t)$ across said first and second Capillary tubes, respectively, said $\Delta P_1(t)$ and $\Delta P_2(t)$ being characterized by a rise time T;

measuring, as a function of time, the concentration C(t) of the individual solute components in the carrier liquid;

obtaining a function S(t), where

$$S(t)=\ln [\Delta P_1(t)/\Delta P_2(t)];$$

obtaining a function So(t), where

$$S_o(t)=\ln [\Delta P_1(t)/\Delta P_2(t)]$$

when only carrier liquid is flowing through both the first and second capillary tubes;

obtaining a function I(t), where

$$I(t)=\int [S(t)-S_o(t)]dt;$$

and relating C(t), I(t) and ΔV to the inherent viscosity of the individual solute components.

4,876,883

PNEUMATIC RING GAUGE

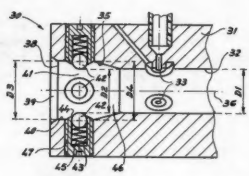
Olivier Ecoffey, Colombier; Théodore Mueller, Lamboing, and Hans Sigg, Neuchatel, all of Switzerland, assignors to Meseltron S.A., Corcelles, Switzerland

Filed Mar. 14, 1988, Ser. No. 168,075

Claims priority, application Switzerland, Mar. 16, 1987, 967/87

Int. Cl.[4] G01B *13/08*

U.S. Cl. 73—37.5 **2 Claims**



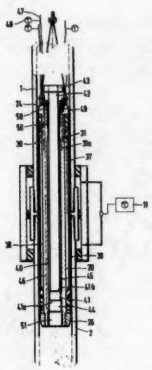
1. A ring gauge (30) for a pneumatic apparatus for measuring an outer diameter of a part (P1), such ring gauge including an entry zone followed by a measuring zone defined by a guide cylinder (32) in which an air jet measuring system (33) is installed, the guide cylinder exhibiting a diameter only slightly greater than the diameter of the part to be measured the entry zone including, successively in the sense of penetration of the part, a first region (38) exhibiting an opening (D3) substantially larger than the opening (D1) exhibited by the guide cylinder, a second region (41) including at least three guide means (42) which define a circle the diameter (D2) of which is equal to the diameter (D1) of the guide cylinder opening, said guide means being adapted to be spread apart against the return force of a spring (45) by the part being measured and a third tapered region (46) having an entry diameter (D4) substantially greater than that of the guide cylinder opening and an exit diameter (D1) equal to that of the guide cylinder opening.

4,876,884

APPARATUS FOR TESTING THE GAS-TIGHTNESS OF JOINTS BETWEEN HOLLOW BODIES

Manfred Jansch, Garbsen, Fed. Rep. of Germany, assignor to Weatherford Oil Tool GmbH, Hanover, Fed. Rep. of Germany

Filed Dec. 29, 1987, Ser. No. 139,013
Claims priority, application Fed. Rep. of Germany, Jan. 8, 1987, 3700384
Int. Cl.[4] G01M *3/28*
U.S. Cl. 73—49.1 6 Claims



1. An apparatus for testing the gas-tightness of joints between hollow bodies, which apparatus comprises:
- a support shaft;
- a first resilient seal element mounted on said support shaft;
- a second resilient seal element mounted on said support shaft and spaced from said first resilient seal element with a space between them;
- a membrane extending between said first resilient seal element and said second resilient seal and second resilient seal elements into two concentric pressure chambers;
- means for transmitting a liquid to one side of said membrane;
- means to supply a gas to the other side of said membrane; and
- a pressure amplifier, said pressure amplifier comprising
  - a bore extending along said shaft,
  - a piston slidable in said bore, said piston having differential pressure surfaces on opposite faces thereof,
  - a channel for conveying liquid to the surface of the piston having the greater pressure area, and
  - a channel interconnecting the surface of the piston having the smaller pressure area with the other side of said membrane.

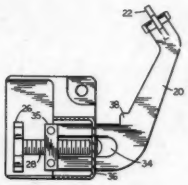
4,876,885

RAILROAD COUPLER MOUNT

Gregory C. Martin, and Gary W. Egerton, both of Montgomery County, Md., assignors to Pulse Electronics, Inc., Rockville, Md.

Filed Jul. 19, 1988, Ser. No. 221,352
Int. Cl.[4] G01L *5/28*
U.S. Cl. 73—129 11 Claims

1. An improved railroad coupler mount for securing signalling and monitoring equipment to the guard arm side of a coupler head, comprising:
- a mounting base for supporting said signalling and monitoring equipment;
- a banana shaped arm member long enough to extend through a pair of horizontally aligned relief holes in said coupler head and extending from said mounting base, said arm member having first and second ends and a bulge section between said first and second ends for bracing against an inside wall of said coupler head;
- a swivel toggle pivotally mounted on said second end of said banana shaped arm member, said swivel toggle being able to pass through said pair of relief holes in an in-line orientation, but preventing the withdrawal of said banana shaped arm when in a perpendicular orientation;
- tightening means on said mounting base and connected to said first end of said banana shaped arm member for tightening said mounting base against said coupler head, said swivel toggle bearing against a sidewall said coupler head when said tightening means draws said banana shaped arm towards said mounting base; and
- stabilizing means on said mounting base for stabilizing said improved railroad coupler mount against rotation in a vertical plane.



9. An improved railroad coupler mount for securing signalling and monitoring equipment to the guard arm side of a coupler head, comprising:
- a mounting base for supporting said signalling and monitoring equipment, said signalling and monitoring equipment being contained in an equipment box releasably fastened to said mounting base and having a compartment door for allowing access to a component positioned inside said equipment box;
- a banana shaped arm member long enough to extend through a pair of horizontally aligned relief holes in said coupler head and extending from said mounting base;
- a swivel toggle pivotally mounted on said banana shaped arm; and
- locking means connected to said mounting base for simultaneously locking said compartment door of said equipment box and locking said mounting base to said coupler head.

4,876,886

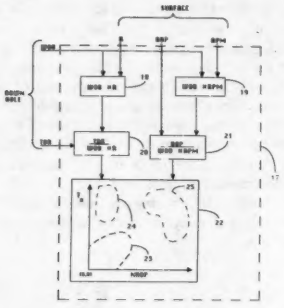
METHOD FOR DETECTING DRILLING EVENTS FROM MEASUREMENT WHILE DRILLING SENSORS

Matthew Bible, Houston; Marc Lesage, Missouri City, and Ian Falconer, The Meadows, all of Tex., assignors to Anadrill, Inc., Sugar Land, Tex.

Filed Apr. 4, 1988, Ser. No. 176,826
Int. Cl.[4] E21B *44/00*
U.S. Cl. 73—151.5 8 Claims

1. A method for determining subsurface conditions encountered by a drill bit while drilling a borehole, comprising the steps of:
- a. during the drilling process, determining rate of penetration and generating a signal indicative thereof;
- b. during the drilling process, determining downhole torque and generating a signal indicative thereof;
- c. in response to signals indicative of rate of penetration and

downhole torque, generating an indication of the occurrence of a subsurface condition selected from the group



comprising high formation porosity, a damaged bit bearing and the development of an undergauge bit.

4,876,887

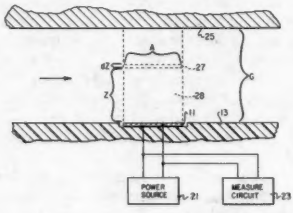
THERMAL FLUX MASS FLOWMETER

Brian E. Mickler, 4028 Tamworth Rd., Fort Worth, Tex. 76116

Filed Jun. 27, 1988, Ser. No. 211,891

Int. Cl.[4] G01F *1/68*

U.S. Cl. 73—204.11 **8 Claims**



1. A mass flowmeter for measuring the velocity of a flowing fluid, comprising in combination:

a sensor adapted to be placed in the flowing fluid, the sensor being capable of generating heat when supplied with electrical power, the sensor having a resistance which is a function of temperature;

a heat sink located a selected distance from the sensor in a direction substantially perpendicular to the flowing fluid;

means for supplying electrical power to the sensor to cause a thermal flux to flow from the sensor to the heat sink which is modulated by the flowing fluid, the heat sink and the sensor being separated from each other by a space that is unobstructed so as to allow the thermal flux to flow from the sensor to the heat sink in a direction substantially perpendicular to the flowing fluid;

means for computing the temperature rise of the sensor over the ambient temperature of the heat sink and the flowing fluid by measuring the resistance of the sensor with said electrical power supplied and subtracting from this measurement the resistance of the sensor at said ambient temperature to determine a difference, and for computing from said difference the temperature rise of the sensor above said ambient temperature, and for computing from said temperature rise and said electrical power supplied, the velocity of the flowing fluid.

4,876,888

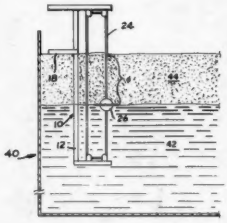
THICKNESS MONITOR FOR FLOATED SLUDGE

John Ricketts, and George M. Grecu, both of P.O. Box 147, Columbia, S.C. 29217

Filed Nov. 17, 1988, Ser. No. 272,425

Int. Cl.[4] G01F *23/30, 23/76*

U.S. Cl. 73—319 **12 Claims**



1. Apparatus for determining the thickness of a layer of aerated sludge floating on a layer of a heavier liquid in a tank, comprising:

(a) a frame means which can be positioned to extend vertically into the tank;

(b) horizontally-extending indicator means supported by and movable vertically with respect to a portion of said frame means extending vertically into said tank, said indicator means being selectively positionable at the highest level of sludge in the tank;

(c) horizontally-extending lower base means attached to said frame means at or near the bottom thereof;

(d) horizontally-extending upper base means attached to said frame means at or near the top thereof; and

(e) a line carrying a float means, said line being movably secured at said upper base means and said lower base means, such that said float means is movable between said upper and lower base means, said float means being floatable on the liquid and including a horizontally-extending portion presenting an upwardly directed generally planar surface, which surface will be parallel to the interface of the sludge and liquid.

4,876,889

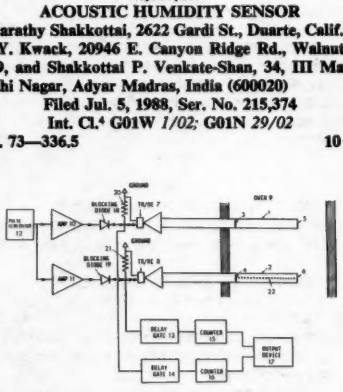
ACOUSTIC HUMIDITY SENSOR

Parthasarathy Shakkottai, 2622 Gardi St., Duarte, Calif. 91010; Eug Y. Kwack, 20946 E. Canyon Ridge Rd., Walnut, Calif. 91789, and Shakkottai P. Venkate-Shan, 34, III Main Rd., Gandhi Nagar, Adyar Madras, India (600020)

Filed Jul. 5, 1988, Ser. No. 215,374

Int. Cl.[4] G01W *1/02;* G01N *29/02*

U.S. Cl. 73—336.5 **10 Claims**



1. An acoustic time-of-flight method for deriving data indicative of average gas temperature and average water vapor content in humidity chambers, ovens, driers, furnaces and the like comprising the steps of:

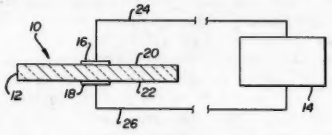
(a) installing a closed tubular sensor containing dry air and allowing it to come to equilibrium with hot, moist air in one of said chambers, ovens, driers, or furnaces,
(b) transmitting sound pulses from the cold end of said tubular sensor and allowing said pulse to propagate through said dry air,
(c) receiving sound pulses partially reflected from both a stub or other reflecting means located in said sensor and the end wall,
(d) measuring a time difference between said reflected pulses,
(e) synchronously transmitting sound pulses in a second tubular sensor of identical size as the first said tubular sensor, but containing many holes in the region between its end wall and stub or other reflecting means, to allow moist environment of said chamber, oven, drier or furnace to be present inside said second sensor,
(f) receiving sound pulses as in (c) partially reflected from the end wall and from said stub or other reflecting means located at the same distance from said end wall as in the first sensor,
(g) measuring a time interval between said pulses in (f),
(h) forming a ratio of time intervals found in (d) and (f) which is equal to ratio of speeds of sound in moist air and in dry air,
(i) and calculating the volume fraction of moisture which is related only to said speed of sound ratio in (h) independently of said air temperature in said chamber, oven, drier or furnace, over an extremely wide range of temperatures.

4,876,890

MOISTURE SENSING APPARATUS AND METHOD

William C. Mercer, Brookfield, Conn.; Peter K. Coughlin, Yorktown Heights, N.Y.; Donald McLeod, Jr., Briarcliff Manor, N.Y., and Edith M. Flanigen, White Plains, N.Y., assignors to UOP, Des Plaines, Ill.

Filed Jun. 29, 1988, Ser. No. 213,236
Int. Cl.[4] G01W *1/00*
U.S. Cl. 73—336.5 **47 Claims**



1. A moisture sensing element comprising an electrically continuous article comprising an inorganic crystalline composition selected from the group consisting of zeolite molecular sieves in which the molar ratio of silica to alumina is greater than 6, silica molecular sieves, non-zeolitic molecular sieves and mixtures thereof; and two electrodes affixed to said article at different locations in current carrying relationship so that the current between said two electrodes passes through at least a portion of said inorganic crystalline composition.

7. The element of claim **1** wherein said zeolite molecular sieve is selected form the group consisting of LZ-210, LZ-105 and mixtures thereof.

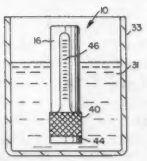
11. The element of claim **1** wherein said inorganic crystalline composition is selected from the group consisting of silicalite, silicalite II, fluoride silicalite and mixtures thereof.

4,876,891

PRODUCT-DISPENSING METHOD AND APPARATUS

George R. Felt, Brown Deer; Donna K. Multhauf, Grafton, and Sudhakar S. Wagle, Mequon, all of Wis., assignors to Rorer Pharmaceutical Corporation, Fort Washington, Pa.

Continuation of Ser. No. 840,876, Mar. 18, 1986, abandoned. This application May 25, 1988, Ser. No. 203,566
Int. Cl.[4] G01F *19/00*; G01G *5/02*
U.S. Cl. 73—426 **1 Claim**



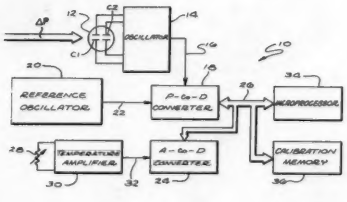
1. Product-dispensing apparatus, comprising:
product-dispensing container means for storing and dispensing flowable product, said container means being floatable in water when the amount of said product contained therein is within a predetermined range;
flotation stabilizing means associated with said container means for stabilizing the angular position of said container means when said container means is floating in water; and
scale means associated with said container means for indicating the position with respect to said scale means of the surface of said water on which said container means is floating, while the amount of said product therein is within said range;
wherein said flotation stabilizing means comprises a cap fitting over a top portion of said container means and containing weighting means at its upper end such that said container means and cap will float in water in a stabilized upright position with said cap facing downwardly in said water; and
wherein said scale means comprises a scale integral with said cap and extending along a side portion of said container means in a vertical direction when said container means is floating in said water.

4,876,892

PRESSURE SENSOR

F. Gene Arabia, Yorba Linda, Calif.; Zvi Shkedi, Tucson, Ariz., and Randy L. Brandt, Orange, Calif., assignors to Allied-Signal Inc., Phoenix, Ariz.

Filed Apr. 19, 1988, Ser. No. 183,103
Int. Cl.[4] G01L *9/12*
U.S. Cl. 73—718 **32 Claims**



1. A sensor responsive to a variable physical parameter and producing an electrical signal varying in response to changes in said physical parameter, said sensor comprising: a variable first capacitor responsive to said physical parameter to change capacitance value predictably in response to change of said physical parameter, a second capacitor, circuit means includ-

ing said first capacitor and said second capacitor for defining a simulated tuned inductor-capacitor circuit having an inductive impedance and not requiring an inductor, said circuit means including a pair of series connecting integrating operational amplifiers, one of said pair of operational amplifiers being in parallel connection with said first capacitor and the other of said pair of operational amplifiers being in parallel connection with said second capacitor, and an inverting operational amplifier series connecting with said pair of operational amplifiers between an output of a first and an input of a second thereof.

4,876,893

STRAIN GAUGES FOR THE PRESSURE SENSOR

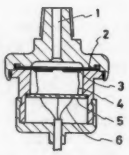
Yukihiro Kato; Masami Ishii; Ryohei Yabuno, and Tetsuo Oka, all of Toyoake, Japan, assignors to Aisin Seiki Kabushiki Kaisha, Aichi, Japan

Filed Dec. 24, 1987, Ser. No. 137,822

Claims priority, application Japan, Dec. 26, 1986, 61-314349

Int. Cl.[4] G01L *7/08, 9/04*

U.S. Cl. 73—726 **7 Claims**



1. A strain gauge comprising:

a base plate of electrically insulated substance; and

a thin alloy film of non-magnetic substance on said base plate wherein said thin alloy film is an amorphous $(Ni_aCr_{10-a})_{100-b}Si_b$ where the ranges of symbols a and b is established as $4 \leqq a(wt\%) \leqq 60$, $3 \leqq b(wt\%) \leqq 8$.

4,876,894

PRESSURE GUAGE CONNECTION

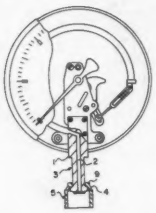
Heinz Heller, Rippberg, and Roland Waigand, Klingenberg-/Main, both of Fed. Rep. of Germany, assignors to Alexander Wiegand GmbH & Co., Klingenberg/Main, Fed. Rep. of Germany

Filed Jun. 16, 1988, Ser. No. 207,771

Claims priority, application Fed. Rep. of Germany, Jun. 25, 1987, 8708828[U]

Int. Cl.[4] G01L *7/04*

U.S. Cl. 73—756 **9 Claims**



1. A connection for connecting a pressure sensor to a pressure vessel or conduit, said connection comprising:

(a) a stem integrally connected at one end to a pressure sensor and having a flange at its other end; and,

(b) an attachment element receiving said flange of said stem therein, said attachment element having a deformation portion which is deformable radially inwardly toward said stem after said attachment element is placed onto said stem, said attachment element having a shoulder thereon which has radially and axially extending surfaces which sealingly engage radially and axially extending surfaces on said stem when said deformation portion is deformed toward said stem whereby said interengaged surfaces form said seal.

4,876,895

ENGINEERING CONSTRUCTIVE LOAD CELL

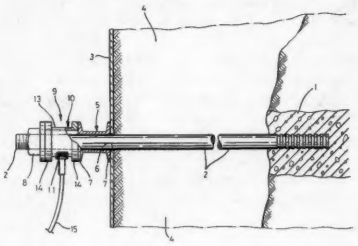
Heng-er Y. Kao, 3F,No. 4-2, Lane 16, Wen-Chow Street, Taipei, Taiwan (10616)

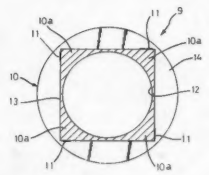
Filed Apr. 14, 1988, Ser. No. 181,355

Claims priority, application Japan, Apr. 14, 1987, 62-56127[U]

Int. Cl.[4] F16B *31/02*

U.S. Cl. 73—761 **8 Claims**





1. A load cell for use in determining a load placed upon said load cell which comprises:

a main body having an axially aligned cylindrical aperture and outwardly extending cylindrical end flanges integral with said main body with an outer central portion separating said cylindrical end flanges,

said outer central portion of said main body having an outer polygonal shape with equally spaced corners along the length of said outer central portion of said main body, and

one each of a plurality of strain gauges affixed adjacent each of said equally spaced corners with each of said strain gages equally spaced from said cylindrical outwardly extending end flanges.

4,876,896

METHOD OF TESTING PROTECTIVE ENCAPSULATION OF STRUCTURAL MEMBERS

Richard K. Snow, Gallatin, and Milton W. Ellisor, Jr., Houston, both of Tex., assignors to I.W. Industries, Inc., Houston, Tex.

Filed Jun. 16, 1986, Ser. No. 874,500

Int. Cl.[4] G01N *3/08*

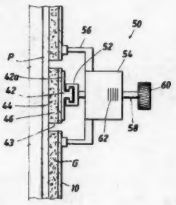
U.S. Cl. 73—827 **4 Claims**

1. A non-destructive field method of determining the minimum acceptable bond strength of a grout filling of an encapsulation jacket to a structural member, including the steps of:

coring the encapsulation jacket and grout filling to isolate a

predetermined size bonded area of the grout filling to the structural member;

subjecting the isolated portion of the grout filling of the encapsulation jacket to a controlled tensile loading for separating the isolated portion of the grout filing of the encapsulation jacket from the structural member only if



the bond strength is less than the specified minimum acceptable bond strength; and

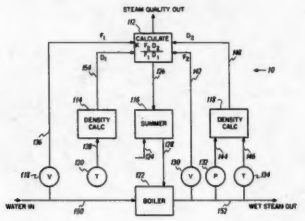
determining the actual bond strength as a function of the tensile loading required to actually separate the isolated portion of the grout filling of the encapsulation jacket form the structural member if the grout filling separates from the structural member.

4,876,897

STEAM QUALITY MEASUREMENT APPARATUS AND METHOD

Joseph P. DeCarlo, and Thomas M. Kegal, both of Wrentham, Mass., assignors to The Foxboro Company, Foxboro, Mass.

Filed Dec. 10, 1987, Ser. No. 130,908
Int. Cl.[4] G01F *1/32, 1/74*
U.S. Cl. 73—861.04 **3 Claims**



1. Apparatus for measuring two-phase flows output from a boiler having water feed and steam output via a flowpipe, comprising:

(a) a horizontally disposed flowpipe carrying from said boiler a two-phase fluid having a vapor phase and a liquid phase;

(b) a first flowmeter means for producing an output signal related to the water feed flow input to said boiler;

(c) a first temperature measuring means for producing an output signal related to the water feed temperature input to said boiler;

(d) first density calculation means for producing a boiler feed density signal from said first temperature measuring means;

(e) a vortex flowmeter for producing a second velocity signal related to the vapor phase flow rate of said two-phase fluid output from said boiler, said vortex flowmeter having a horizontally disposed vortex generating bar mounted transversely within said flowpipe;

(f) means for determining the density of the vapor phase of said two-phase fluid and producing a density signal therefrom; and

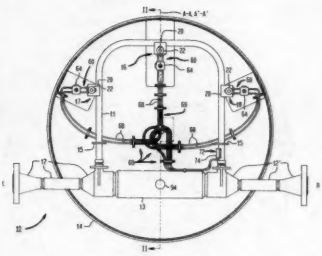
(g) calculation block means for deriving the two-phase flow measurand from said first and second density signals, said first flow velocity signal, and said second velocity signal.

4,876,898

HIGH TEMPERATURE CORIOLIS MASS FLOW RATE METER

Donald R. Cage, Longmont, and Craig B. Van Cleve, Lyons, both of Colo., assignors to Micro Motion, Inc., Boulder, Colo.

Filed Oct. 13, 1988, Ser. No. 257,806
Int. Cl.[4] G01F *1/84*
U.S. Cl. 73—861.38 **10 Claims**



1. A Coriolis mass flow meter, electrically connectable to processing means including means for providing a driver signal to said meter and to means for processing a deflection signal produced in said meter to provide an output representative of the mass flow rate of the fluid flow, said flow meter being capable of operating in a temperature range having a lower boundary in excess of 260 degrees C., comprising:

means for hermetically enclosing said flow meter;

an inert gas situated within said enclosing means;

flow conduit means, substantially insusceptible to carbide precipitation occurring in said temperature range, for receiving fluid therethrough whose mass flow rate is to be measured;

means for mounting said flow conduit;

high temperature driver means, responsive to said driver signal, for vibrating said flow conduit with respect to said mounting means;

high temperature sensor means for sensing the deflection of said flow conduit means caused by fluid flow through said flow conduit means and for producing said deflection signal representative of said deflection, said driver and said sensor means comprising:

a high temperature magnet means; and

a high temperature coil means;

terminal block means, having multiple conductors, mounted adjacent to said high temperature coil means and in a stationary relationship with respect to said enclosing means; and

high temperature flexure means, having one or more uninsulated electrical conductors, for electrically interconnecting said coil means of said driver means and said sensor means with said adjacent terminal block means, said flexure means dimensioned so as to form a U-shape when electrically interconnecting said coils with said conductors of said adjacent terminal block means;

feed-through means having multiple conductors therethrough for providing an hermetically sealed passage for routing signals through said enclosing means, said signals including said driver signals and said deflection signals from said driver means and said sensor means;

multiple internal insulated wiring leads for electrically inter-

connecting individual ones of said conductors of said terminal block means with corresponding internal ends of said individual conductors of said feedthrough means; and

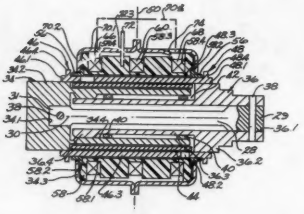
multiple external insulated wiring leads for providing at least a portion of the electrical interconnection between individual ones of said conductors of said external ends of said individual conductors of said feed-through means and said processing means.

4,876,899

TORQUE SENSING DEVICE

Douglas B. Strott, Attleboro, and Keith W. Kawate, Attleboro Falls, both of Mass., assignors to Texas Instruments Incorporated, Dallas, Tex.

Filed Oct. 31, 1988, Ser. No. 264,754
Int. Cl.[4] G01L *3/10*
U.S. Cl. 73—862.33 **12 Claims**



1. A torque sensing device comprising a member having one end rotatable around a member axis relative to an opposite end of the member in response to an applied torque to an extent representative of the applied torque; a pair of ferromagnetic elements secured to respective member ends to be rotatable therewith, each element having a plurality of portions spaced around the member axis extending into interleaved relation with portions of the other element to form a plurality of pairs of the portions of the respective elements at each of two sides of a plane which extends transversely across the member axis between the ends of the member, the portions of the respective elements in each pair being normally disposed in a first closely spaced relation to each other to form a selected discontinuity therebetween and to be responsive to said relative rotation of the member ends to increase said discontinuity between the element portions in each pair at one side of the plane and decrease said discontinuity between the element portions in each pair at an opposite side of the plane; a magnetic field exciting coil for inducing magnetic leakage flux at said pairs of element portions representative of the discontinuity between the element portions in the pairs; and a pair of sensing coils disposed at respective sides of said plane coupled to the magnetic leakage flux at said pairs of the spaced element portions at the respective sides of said plane, the sensing coils being differentially connected to be responsive to said flux to provide an output signal corresponding to the applied torque.

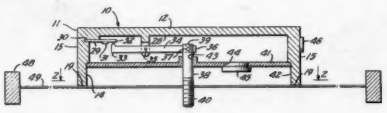
4,876,900

RACKET STRING TENSION TESTER

William P. Carney, and Donald P. Carney, both of 4 High Ridge La., Oyster Bay, N.Y. 11771

Filed Jun. 13, 1988, Ser. No. 205,846
Int. Cl.[4] G01L *5/06*
U.S. Cl. 73—862.48 **10 Claims**

1. In a device for determining tension in the strings of a tennis racket, the strings forming a grid, including a generally cylindrical mainframe adapted to contact said strings on a first side thereof and a string deflecting means adapted to contact said strings on a second side thereof serving to deflect said strings to a predetermined degree; and sensing means for determining the value of tension in said strings developed upon deflection to said predetermined degree, the improvement comprising: said sensing means carried by said mainframe; said deflecting means including a shaft projecting through an interstice between four intersecting generally centrally disposed string segments, said shaft having a first end contacting said sensing means, and a second end having deflecting means thereon; an interchangeable cylindrical washer having a centrally disposed bore surrounding said shaft, and adapted to be



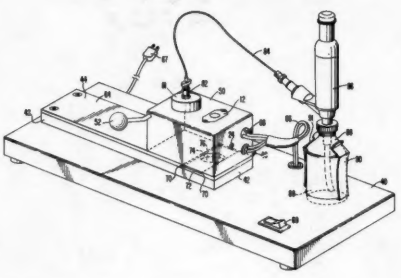
contacted by said deflecting means to deflect said strings from the plane of said grid; said washer having a planar base of diameter greater than the width of said interstice, and having a surface adapted to contact said strings, and means for centering said washer with respect to said interstice; whereby upon operation of said deflecting means, the force required to cause the degree of deflection of said strings will be confined substantially to the strings forming said interstice.

4,876,901

ASBESTOS SAMPLE FILTER CLEARING SYSTEM

Jeptha E. Campbell, Cincinnati, Ohio, assignor to Spiral Systems, Inc., Cincinnati, Ohio

Filed Aug. 10, 1988, Ser. No. 230,522
Int. Cl.[4] G01N *1/00*
U.S. Cl. 73—863 **13 Claims**



1. Apparatus for clarifying asbestos fibers collected on a cellulose ester membrane filter comprising:

a base;

a container of liquid acetone secured to said base;

a slide for supporting a filter;

a metal plate having an upper surface for supporting said slide at a first position;

means having a heat conducting relationship with said metal plate for applying acetone vapors to said filter, said means including a heated flash chamber to vaporize said acetone, said flash chamber being off-set from said first position, and heated conduit means for transporting said vapors to said first position whereby the vapors condense upon reaching said filter;

means associated with said container for injecting a limited amount of liquid acetone to said flash chamber to restrict the quantity of vapors to the quantity needed for clearing said filter material; and

a slab of insulating material sandwiched between said base and said metal plate whereby the metal plate is maintained at an elevated temperature relative to said base by the heat associated with said heated flash chamber.

3. Apparatus for clarifying asbestos fibers collected on a cellulose ester membrane filter comprising:

a base;

a container of liquid acetone secured to said base;

a slide for supporting a filter;

a metal plate having an upper surace for supporting said slide at a first position;

means having a heat conducting relationship with said metal plate for applying acetone vapors to said filter, said means including a heated flash chamber to vaporize said acetone, said flash chamber being off-set from said first position, and heat conduit means for transporting said vapors to said first position whereby the vapors condense upon reaching said filter;

means asociated with said container for injecting a limited amount of liquid acetone to said flash chamber to restrict the quantity of vapors to the quantity needed for clearing said filter material;

a slab of insulating material sandwiched between said base and said metal plate whereby the metal plate is maintained at an elevated temperature relative to said base by the heat associated with said heated flash chamber; and

the vapor applying means comprises a block of heat conductive material mounted by a hinge means along one edge to said slab of insulating material to permit pivotal movement of said block relative to said metal plate about a horizontal pivot axis, and said apparatus further comprises a handle to lift a side of said block opposite said hinge means to facilitate loading and removal of said slide from said first position.

4,876,902

METHOD FOR DRAWING SAMPLES FROM MATERIAL CONTAINING SOLID INGREDIENTS

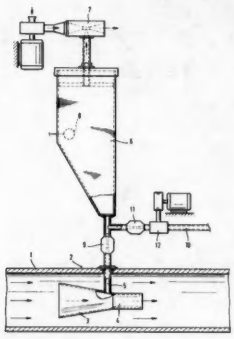
George C. von Alfthan, Espoo, and Jorma T. Helanniemi, Helsinki, both of Finland, assignors to Outokumpu Oy, Helsinki, Finland

Filed Apr. 21, 1988, Ser. No. 184,408

Claims priority, application Finland, Apr. 23, 1987, 871781

Int. Cl.[4] G01N *1/14*

U.S. Cl. 73—863.83 **9 Claims**



1. An apparatus for drawing a sample from a flow of slurry material, comprising:

a sampling member defining a passage having a first end and a second end, the sampling member being adapted to be place with the first and second ends of the passage both in direct open communication with the flow of slurry and the first end upstream of the second end,

a flow control device having a first state in which it permits flow of slurry through the passage and a second state in which it prevents such flow, and

suction means coupled to the passage defined by the sampling member at a location between the flow control device and the first end of the passage, for extracting slurry material from the passage when the flow control device is in its second state.

9. An apparatus for conducting a slurry material from a first location to a second location, comprising:

a duct through which the slurry material flows from the first location to the second location,

a sampling member defining a passage having a first end and a second end, the first and second ends of the passage being in direct open communication with the interior space of the duct at locations spaced apart along the duct, whereby slurry material flowing from the first location to the second location may enter the passage at the first end thereof and leave the passage at the second end thereof,

a flow control device located inside the duct and having a first condition in which it permits flow of slurry material through the passage and a second condition in which it prevents flow of slurry material through the passage,

a sampling conduit connected to the sampling member at a location between the flow control device and the first end of the sampling member, and

suction means connected to the sampling conduit for drawing slurry material from the passage.

4,876,903

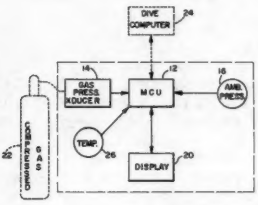
METHOD AND APPARATUS FOR DETERMINATION AND DISPLAY OF CRITICAL GAS SUPPLY INFORMATION

William D. Budinger, 16 Southridge Dr., Kennett Square, Pa. 19348

Continuation-in-part of Ser. No. 142,370, Jan. 11, 1988, abandoned. This application Mar. 21, 1988, Ser. No. 169,651

Int. Cl.[4] G06F *15/42*

U.S. Cl. 73—865.1 **2 Claims**



1. A portable diving apparatus for continuously displaying, during a dive, the amount of time that a known amount of pressurized breathable gas can be consumed at a known rate from a fixed volume container if a user changes from a present ambient pressure during a dive to some other ambient pressure comprising:

means for determining a current ambient pressure of the user;

means for determining the amount of breathable gas in the container;

means for determining the present consumption rate of gas by the user at the current ambient pressure;

means for determining the maximum time (Adjusted Remaining Air Time) that the remaining supply of gas will sustain the present consumption rate of the gas by the user at the present ambient pressure and for each of a plurality of ambient pressures other than the present ambient pressure, and allowing for any predetermined reserve; and

display means, including a two-dimensional pictorial display showing variations in depth along one axis and increments of time on the other axis for simultaneously, graphically displaying to the user representations of the current ambient pressure, the other ambient pressures and the associ-

ated Adjusted Remaining Air Time for the current ambient pressure and for each of the other ambient pressures.

2. A portable diving apparatus for continuously displaying during a dive the amount of time that a known amount of pressurized breathable gas can be consumed at a known rate from a fixed volume container if a user changes from a present ambient pressure during a dive to surface pressure, comprising:

means for determining a current ambient pressure of the user associated with the current depth of the user;

means for determining the amount of breathable gas in the container;

means for determining the present consumption rate of gas by the user at the current ambient pressure;

means for determining the amount of breathable gas which will be consumed by the user in ascending to the surface from a plurality of selected depths;

means for determining the maximum time (Adjusted Remaining Air Time) that the remaining supply of gas will sustain the present consumption rate of the gas by the user at the present ambient pressure and allowing for any predetermined reserve and for determining the maximum rate (Safe Air Limit) that the remaining amount of breathable gas will allow the user to remain at the current depth and at each of the plurality of selected depths and then ascend to the surface without consuming the predetermined gas reserve; and

display means for displaying to the user a representation of the time in the future at which the user must begin to ascent to the surface to avoid having the present and projected consumption of a breathable gas from the fixed volume container cause the gas supply to fall below predetermined safety limits, the display means including a two dimensional pictorial display showing variations in depth along one axis and increments of time on the other axis for simultaneously, graphically displaying to the user representations of the current ambient pressure, the associated Adjusted Remaining Air Time for the current ambient pressure and the Safe Air Limit Times for the current depth and for each of the plurality of selected depths.

4,876,904

METHOD AND AUTOMATIC DEVICE FOR MEASURING THE CONTENT OF A SOLUBLE COMPONENT IN A POWDERY PRODUCT

Bernard Limon, Ceyzeriat, France, assignor to Hasler Freres International S.A., Switzerland

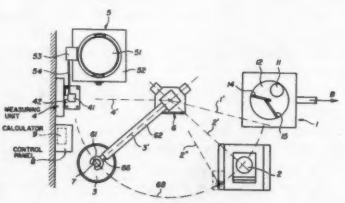
PCT No. PCT/CH86/00097, § 371 Date Apr. 16, 1987, § 102(e) Date Apr. 16, 1987, PCT Pub. No. WO87/00636, PCT Pub. Date Jan. 29, 1987

PCT Filed Jul. 14, 1986, Ser. No. 44,845

Claims priority, application France, Jul. 16, 1985, 85 10987

Int. Cl.[4] G01N *33/38, 27/00, 5/00*

U.S. Cl. 73—866 **9 Claims**



1. An automatic method of determining the quantity of a soluble component in a powdery product comprising the steps of:

(a) providing a sample receiving container;

(b) weighing said sample receiving container;

(c) computing the weight of a predetermined quantity of a solvent for said soluble component and introducing said predetermined quantity of solvent into said sample receiving container;

(d) introducing a predetermined quantity of said powdery product into said sample receiving container including said computed weight of said solvent;

(e) weighing said solvent receiving container with said predetermined quantity of said powdery product and said solvent therein;

(f) computing the weight of said predetermined quantity of said powdery product;

(g) computing the weight ratio of said predetermined quantity of said powdery product to said predetermined quantity of said solvent;

(h) agitating said predetermined quantity of said powdery product and said predetermined quantity of said solvent within said sample receiving container so as to create a solution of said soluble component in said powdery product;

(i) determining an electrical characteristic of said solution of said soluble component in said powdery product; and

(j) correcting said electrical characteristic of said solution as a function of said weight ratio of said predetermined quantity of said powdery product to said predetermined quantity of said solvent.

4,876,905

POSITIONING ARRANGEMENT FOR A MEASURING-VALUE SENSOR

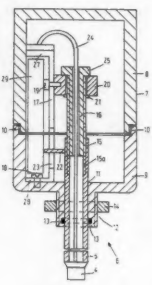
Georg H. Callsen, and George U. P. Kindler, both of Hamburg, Fed. Rep. of Germany, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Jul. 25, 1988, Ser. No. 224,083

Claims priority, application Fed. Rep. of Germany, Jul. 28, 1987, 3724897

Int. Cl.[4] G01B *7/14*

U.S. Cl. 73—866.5 **8 Claims**



1. A positioning arrangement for a sensor, comprising:

a housing, said housing comprising a base part and a cover part for connection to said base part for enclosing a space therebetween, said base part having a bore therethrough defining an axis of said arrangement;

an elongate guide tube having a first end disposed in the interior space of said housing and extending through said bore to a second end external to said housing, said second end being adapted for receiving a sensor, and said guide tube being complementary in shape to said bore for being slidably received therein;

guide means for preventing rotation of said guide tube during axial translation of said guide tube through said bore;

a tubular adjustment screw disposed within said housing for translating said guide tube in said bore and axially positioning said guide tube with respect to said housing;

holding means within said housing for rotatably supporting

said adjustment screw and fixing said tubular adjustment screw in the axial direction; and

an electrical connection cable extending from said second end of said guide tube through said tubular adjustment screw and having an end portion secured within said housing, said tubular adjustment screw having an internal diameter such that said electrical connection cable extends therethrough with a clearance fit and is not rotated by rotation of said adjustment screw,

said adjustment screw and said first end of said guide tube having threaded portions in threading engagement such that rotation of said adjustment screw in a first direction of rotation advances said guide tube away from said housing and rotation of said adjustment screw in the opposite direction of rotation advances said guide tube towards said housing,

during rotation of said adjustment screw said guide tube being guided by said guide means and advancing without rotation, and

said threaded portions of said guide tube and adjustment screw having a length chosen such that said guide tube has a predetermined range of axial travel.

4,876,906

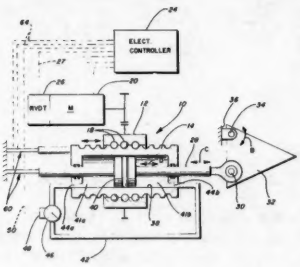
NON-JAMMING ACTUATOR SYSTEM

Teddy L. Jones, Cherry Valley, Ill., assignor to Sundstrand Corporation, Rockford, Ill.

Filed Nov. 20, 1986, Ser. No. 932,878

Int. Cl.[4] B64C *13/42*

U.S. Cl. 74—89.15 **9 Claims**



1. A non-jamming actuator system, comprising:

a ballscrew assembly including a rotatable nut and an axially movable ballscrew, said ballscrew having means thereon for cooperating with the nut and for producing axial movement of the ballscrew upon the nut being rotated, the ballscrew comprising a cylinder of a double-acting piston and cylinder device;

drive means for rotating the nut;

axially moveable actuator means operatively associated with a load to be actuated, the actuator means being coupled to a piston within a chamber defined by said cylinder,

at least part of said cooperating means on said ballscrew axially overlapping said cylinder chamber; and

a closed hydraulic circuit, including selectively operable valve means, communicating with the cylinder on opposite sides of the piston, whereby a closed condition of the valve means traps fluid in the circuit to effect movement of the actuator means in response to movement of the ballscrew and an open condition of the valve means allows fluid flow in the circuit in the event of failure or jamming of the ballscrew assembly to allow reaction movement of the actuator means in response to load forces.

4,876,907

MOTOR VEHICLE GEARBOX

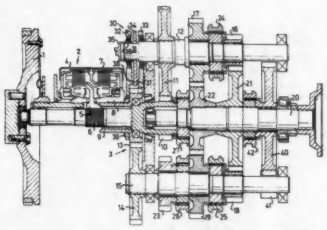
Lars Andersson, Västra Frölunda, and Sven Andersson, Floda, both of Sweden, assignors to AB Volvo, Gothenburg, Sweden

Filed Feb. 16, 1988, Ser. No. 156,142

Claims priority, application Sweden, Feb. 13, 1987, 8700583

Int. Cl.[4] F16H *3/38*

U.S. Cl. 74—331 **6 Claims**



1. A motor vehicle gearbox, comprising first and second concentrically mounted input shafts, said input shafts arranged to be driven alternately such that one said input shaft comprises a temporarily non-driven input shaft, an output shaft, and first and second countershafts driven by said first and second input shafts, respectively, said countershafts having gear wheels in engagement with gear wheels on said output shaft, at least one of the gear wheels on each countershaft being rotatably mounted thereon and being lockable by means of engaging means to said countershaft, and each input shaft being in driving engagement with a corresponding countershaft, said first and second countershafts being coordinated with synchronizing means shiftable independently of said engaging means, by means of which synchronizing means each countershaft, which is drivingly coupled to said respective temporarily non-driven input shaft, can be accelerated up to a rotational speed determined by a gear speed selected.

4,876,908

TRANSMISSION WITH PLURAL TORQUE TRANSMISSION PATHS

Eric A. Pengilly, 17 Wellington Court, Knightsbridge, London SW1, United Kingdom

Filed Apr. 30, 1987, Ser. No. 44,269

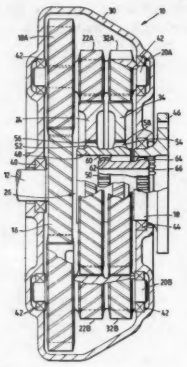
Claims priority, application United Kingdom, May 2, 1986, 8610756

Int. Cl.[4] F16H *57/12*

U.S. Cl. 74—410 **19 Claims**

1. A transmission comprising input and output rotatable members between which torque is to be transmitted, a first single-helical gear rotatable with one of said members, a plurality of further helical gears meshed with said first gear, coupling means for coupling said further gears with the other said member, and mounting means for said first gear arranged to permit the axis of said first gear to pivot about a radial axis under the action of reaction forces arising under load so that torque can

be transmitted between the members through each of said further helical gears, characterized in that the mounting means



is arranged also to permit the first gear axis to move in a radial direction independently of the pivoting of the first gear.

4,876,909

VEHICLE DOOR LOCKING SYSTEM

Marcel Andrei-Alexandru, Bietigheim-Bissingen; Heiner Bayha, Sersheim; Rainer Bruhn, and Iris Maier, both of Bietigheim-Bissingen, all of Fed. Rep. of Germany, assignors to SWF Auto-Electric GmbH, Bietigheim-Bissingen, Fed. Rep. of Germany

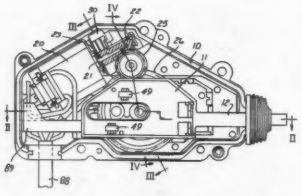
PCT No. PCT/EP87/00424, § 371 Date Apr. 14, 1988, § 102(e) Date Apr. 14, 1988, PCT Pub. No. WO88/01334, PCT Pub. Date Feb. 25, 1988

PCT Filed Aug. 1, 1987, Ser. No. 208,357

Claims priority, application Fed. Rep. of Germany, Aug. 16, 1987, 3627893

Int. Cl.[4] E05B *65/12, 47/00*

U.S. Cl. 74—411.5 **5 Claims**



1. In a vehicle door locking device including a housing, an elongate lock actuating slide mounted for longitudinal reciprocatory movement along a fixed path within said housing between a locked position and are unlocked position, manually operable means for shifting said slide between said locked and unlocked position, crank means mounted in said housing at one side of said slide for rotation about a fixed axis normal to said fixed path and having a relatively small diameter pin means projecting toward said slide at fixed radial distance from said axis, a pair of stop members longitudinally and transversely offset from each other fixedly mounted on and projecting from said slide member into the path of rotation of said pin means about said axis, the longitudinal spacing of said stop means being less than the radial distance between said axis and said pin means and the transverse offset between said stop means being greater than the diameter of said pin means, unidirectional rotary drive means operable to drive said crank means about said axis between first and second parked positions 180° apart from each other wherein said slide may be manually shifted between said locked and unlocked positions without interference between said pin means and said stop means, said pin means being engageable with one of said stop means during rotation of said crank means between said parked positions to shift said slide between its locked and unlocked positions; the improvement wherein said drive means comprises a rotary member coupled to said crank means; brake means engageable with said rotary member to apply a predetermined braking force resisting rotation of said rotary member, and brake actuating means for applying said brake means when said crank means is within a predetermined rotative displacement from either of said parked positions and for releasing said brake means at all other rotary portions of said crank means.

4,876,910

TILTING STEERING APPARATUS

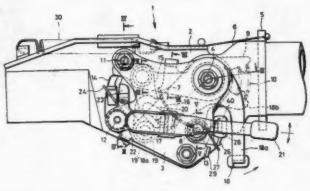
Masumi Nishikawa, Toyoake, and Masanobu Ishikawa, Nagoya, both of Japan, assignors to Aisin Seiki Kabushiki Kaisha, Japan

Filed Mar. 17, 1988, Ser. No. 169,508

Claims priority, application Japan, Mar. 20, 1987, 62-63975; Mar. 23, 1987, 62-65583

Int. Cl.[4] B62D *1/18*

U.S. Cl. 74—493 **6 Claims**



1. A tilting steering apparatus for a vehicle, which comprises:

a fixed bracket secured to a chassis of the vehicle;

a movable bracket pivotally supported on said fixed bracket;

a ratchet provided on said movable bracket and having terminal ratchet teeth;

a pawl having pawl teeth meshing with the terminal ratchet teeth and constraining the ratchet position;

a tilt operation lever causing the pawl teeth and the terminal ratchet teeth to be meshed and unmeshed with each other;

means for biasing said movable bracket to a lifted position with respect to said fixed bracket;

a main lever rotatably supported by a first pin about which said movable bracket is turned, said main lever pivotally supporting the pawl;

a second pin secured to said fixed bracket so as to abut against the other end of said main lever to inhibit turning of said main lever in one direction;

a hook lever supported by said fixed bracket so as to clamp said main lever in the inhibit position in cooperation with said second pin;

a lifted position locking means provided on said fixed bracket for engaging and locking at a lifted position a projection provided on said ratchet;

a lift operating lever pivotally mounted on said fixed bracket and adapted to unclamp said main lever by the turning of said hook lever; and

a return lever pivotally supported on said fixed bracket for disengaging the lifted position lock means and said projection of said ratchet member from each other.

4,876,911

REMOTELY CONTROLLED MIRROR DEVICE OF WIRE TYPE

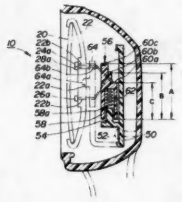
Kenji Kurihara, Yamato, Japan, assignor to Nissan Motor Co., Ltd., Yokohama, Japan

Continuation of Ser. No. 943,758, Dec. 19, 1986, abandoned. This application Aug. 17, 1988, Ser. No. 232,945

Claims priority, application Japan, Dec. 30, 1985, 60-204066[U]

Int. Cl.[4] F16C *1/10*

U.S. Cl. 74—502.1 **11 Claims**



1. A mirror device remotely controlled by a control device, comprising:

a mirror housing;

a mirror unit pivotally disposed in said mirror housing;

a plurality of wire assemblies each including a wire and a shield tube in which said wire is longitudinally slidable, each wire assembly extending between said mirror unit and said control device so that said mirror unit and said control device so that said mirror unit is pivotally movable in response to manipulation of said control device;

a wire guide member mounted in said mirror housing, said wire guide member having a base portion resiliently mounted on a stud portion, said base portion having a plurality of stepped curved surfaces which said wire assemblies slidably contact respectively; and

resilient means for resiliently urging said base portion in a direction away from said stud portion to cause said curved surfaces of said wire guide member to simultaneously press said wire assemblies and thereby apply tension to said wire assemblies, said curved surfaces being so stepped and constructed having different radii of curvature as to apply said wire assemblies with substantially equal tension.

4,876,912

SWITCHING MECHANISM FOR DRIVING SELF-PROPELLING AGRICULTURAL MACHINES

Franz Stein, Harsewinkel, Fed. Rep. of Germany, assignor to Claas Ohg, Harsewinkel, Fed. Rep. of Germany

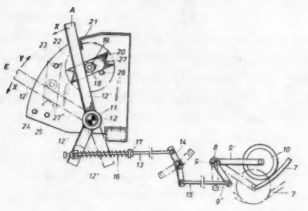
Filed Oct. 13, 1988, Ser. No. 257,965

Claims priority, application Fed. Rep. of Germany, Oct. 13, 1987, 3734554

Int. Cl.[4] G05G *5/06*

U.S. Cl. 74—535 **4 Claims**

1. A switching mechanism for driving a self-propelling agricultural machine, particularly a harvester thresher, comprising a switching lever supported rotatably around a pivot point against a spring force; a pawl associated with said switching lever and operative for securing the latter in its switching-on position, said pawl being rotatably connected with said switching lever and having two notches spaced by equal distances from said pivot point; four stationary pins associated with said switching lever for controlling a rotary position of said pawl during a manual displacement of said switching lever alternatingly in one of two switching positions; and abutments each associated with a respective one of the switching positions and



holding said switching lever by means of the spring force in a selected switching position.

4,876,913

GEAR SELECTOR FOR BICYCLE SPEED GEARS

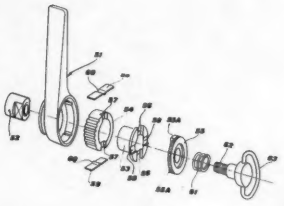
Antonio Romano, Padua, Italy, assignor to Campagnolo S.p.A., Vicenza, Italy

Filed Aug. 20, 1987, Ser. No. 87,389

Claims priority, application Italy, Sep. 9, 1986, 21647 A/86; Feb. 11, 1987, 19346 A/87

Int. Cl.[4] G05G *5/06*

U.S. Cl. 74—535 **4 Claims**



1. A gear selector for controlling speed gears with a spring-loaded derailleur for sport and racing bicycles, said gear selector comprising

an operating lever mounted rotatably on a pivot;

a snap-action mechanism controlling a plurality of positions of said lever which positions correspond to a like number of positions of correct alignment of the speed gear with which various sprockets of a free wheel correspond;

means for activating and deactivating said snap-action mechanism on command;

said snap-action mechanism comprising a removable toothed ring mounted coaxially to said gear selector lever on a bush locked against rotation;

pawl means for engaging said toothed ring in diametrically opposed positions, said pawl means comprising an integral portion of spring means which urges said pawl means into engagement with said toothed ring; and

said means for activating and deactivating said snap-action mechanism comprising a clutch ring by which said toothed ring can be made rigid with or free to rotate about said bush.

4,876,914

PARKING-BRAKE OPERATING DEVICE

Kimio Kanno, Toyota, Japan, assignor to Toyoda Iron Works Co., Ltd., Japan

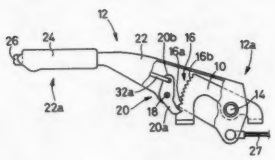
Filed May 26, 1988, Ser. No. 199,146

Int. Cl.[4] G05G *1/10*

U.S. Cl. 74—538 **4 Claims**

1. A parking-brake operating device for selectively placing a

parking brake in an operative and an inoperative position thereof, the device including (a) an operating lever which is selectively placed in a first and a second position thereof to place said parking brake in said operative and inoperative positions, respectively, said lever being disposed pivotably about a first pivot axis and connected to said parking brake through a brake cable, said lever including a free end portion having a free end, said portion having a longitudinal hole which is formed along a longitudinal axis of the lever and is open in said free end; (b) a stationary sector having a plurality of teeth; (c) a pawl supported by said lever pivotably about a second pivot axis parallel to said first pivot axis, said pawl having a first and a second arm; (d) a knob having a first and a second end, and fitted, over an axial part thereof having said first end, in said longitudinal hole of said lever such that said knob is retractable inward upon operation thereof on said second end, said axial part having an axial recess which is formed therein and is open in said first end and a lateral surface adjacent to said first end, said knob having at said first end a stopper protruding radially inward from an inner wall surface thereof defining said axial recess; (e) a release rod having a first and second end, said second arm of said pawl being connected to said first end, said rod including a head having said second end, said head being fitted in said axial recess of said knob such that said head is engageable with said stopper; (f) a first spring possessing a first biasing force for permitting said pawl to be pivoted about said second pivot axis in a first direction to cause said first arm of the pawl to be engaged with said plurality of teeth of said sector; and (g) a second spring fitted in said axial



recess of said knob and possessing a second biasing force for permitting said head of said rod to be engaged with said stopper of the knob, said second biasing force being determined such that, upon retraction of said knob when said lever is held in said second position, said second spring causes said rod to be moved relative to said lever with said head engaged with said stopper, whereby said pawl is pivoted in a second direction opposite to said first direction and said first arm of the pawl is released from the engagement with said sector, and that, upon retraction of said knob when the lever is held in said first position, said second spring permits said knob to be moved relative to said rod, while said second biasing force is overcome by pivot resistance associated with the forced engagement between said pawl and said sector due to a tension force of said brake cable, whereby said rod is not moved relative to said lever and said pawl is not released from said forced engagement with said sector,

the parking-brake operating device comprising the improvements that:

said knob has cylindrical shape and is fitted in said longitudinal hole of said operating lever, said head of said release rod having a pair of opposite side surfaces, said inner wall surface of said knob including a pair of opposed wall surfaces, and said head is fitted in said axial recess of the knob such that said pair of opposite side surfaces of said head are fitly engaged with said pair of opposed wall surfaces of said inner wall surface, respectively, whereby said knob is not rotatable about said longitudinal axis of said longitudinal hole.

4,876,915

STEERING WHEEL

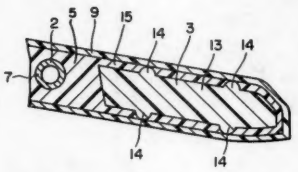
Yasuaki Iuchi, Aichi, Japan, assignor to Toyoda Gosei Co., Ltd., Nishikasugai, Japan

Continuation of Ser. No. 60,614, Jun. 11, 1987, abandoned. This application Mar. 28, 1989, Ser. No. 331,045

Claims priority, application Japan, Aug. 28, 1986, 61-204949; Aug. 29, 1986, 61-122610[U]

Int. Cl.[4] B62D *1/04*; B28B *9/00*

U.S. Cl. 74—552 **5 Claims**



1. A steering wheel intermediate product including a part on which a thick covering material is molded, comprising:

a core metal;

at least one resinous insert, each said insert having positioning protrusions defined on both top and bottom surfaces thereof; and

first means for covering said core metal and said at least one resinous insert which is injection molded into a die containing said core metal and said at least one resinous insert so as to define therewith the steering wheel intermediate product, a position of the at least one resinous insert which is spaced apart and separated from the core metal being defined in the die while the protrusions of the resinous insert contact the die, the height of said positioning protrusions being substantially equal to or less than a thickness of said first covering means.

4,876,916

CAST SHAFTS, PARTICULARLY CAMSHAFTS

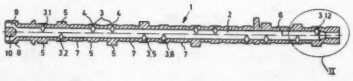
Konrad Maier, Romanshorn, Switzerland, assignor to Von Roll, AG, Gerlafingen, Switzerland

Filed Dec. 9, 1987, Ser. No. 130,413

Claims priority, application Switzerland, Dec. 18, 1986, 5043/86

Int. Cl.[4] F16H *53/00*

U.S. Cl. 74—567 **10 Claims**



1. An elongated generally cylindrical iron shaft having a longitudinal axis and a centrally disposed longitudinal channel extending completely therethrough along the axis, the shaft further having a plurality of transverse channels extending outwardly from the longitudinal channel completely through the shaft to the outside thereof and communicating with the longitudinal channel, each transverse channel having the shape of a nozzle and being wider at said longitudinal channel than at outside openings thereof, the outside openings of the transverse channels being spaced apart and disposed along a helical path on an outer surface of the shaft, the helix having an axis coincident with the longitudinal axis, said shaft together with said longitudinal channel and said transverse channels being cast as a single piece.

4,876,917
TORQUE VARIATION ABSORBING DEVICE

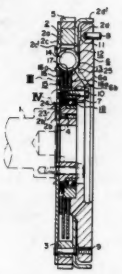
Shigetaka Aiki, Kariya; Kiyonori Kobayashi, Chiryu, and Satoshi Kato, Anjo, all of Japan, assignors to Aisin Seiki Kabushiki Kaisha, Kariya and Toyota Jidosha Kabushiki Kaisha, Toyota, both of, Japan

Continuation of Ser. No. 25,631, Mar. 13, 1987, abandoned, which is a continuation of Ser. No. 755,899, Jul. 17, 1985, abandoned. This application Jul. 29, 1988, Ser. No. 227,445

Claims priority, application Japan, Jul. 19, 1984, 59-108288[U]; Jul. 19, 1984, 59-108289[U]; Jul. 19, 1984, 59-108290[U]

Int. Cl.[4] F16D *3/14;* F16F *15/10*

U.S. Cl. 74—574 13 Claims



1. A torque variation absorbing device comprising:

a driving plate coupled to an engine crankshaft;

a flywheel, which is connectable to a power train, arranged coaxial with said driving plate and rotatably supported via a bearing on said driving plate, said flywheel comprising a flywheel body extending in a radial direction of said flywheel so as to be opposed to said driving plate in an axial direction of said flywheel and to be provided substantially parallel to said driving plate; and

a spring mechanism, a torque limiting mechanism and a hysteresis mechanism interposed between said driving plate and said flywheel, said spring mechanism extending in a circumferential direction of said driving plate and flywheel, said torque limiting mechanism being adjusted so as to slip only when an excessively large torque acts on said torque limiting mechanism and being located radially inside of said spring mechanism, and said hysteresis mechanism being provided so as to produce a friction force when relative rotation occurs between said driving plate and said flywheel, said spring mechanism and said torque limiting mechanism being arranged in series with each other and between said driving plate and said flywheel as a vibration damping system, said hysteresis mechanism being arranged in parallel to the series arrangement of said spring mechanism and said torque limiting mechanism.

4,876,918
HIGH SPEED DIFFERENTIAL UNIT

John L. Hudson, Rte. 1, Florence, S.C. 29501

Filed Jul. 11, 1988, Ser. No. 217,615

Int. Cl.[4] F16D *41/06;* F16H *35/04*

U.S. Cl. 74—650 13 Claims

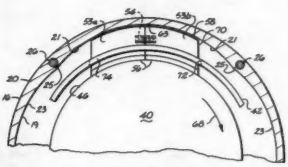
1. A drive arrangement for differentially powering a pair of drive axles, said drive arrangement comprising:

rotatably drivable housing means, adapted for receiving rotating drive power applied thereto for driven rotation of said housing means, and for rotatably receiving at least one end of each respective drive axle, said housing means being generally annular in nature, with an inside diameter defining relatively inwardly-projecting engagement areas;

a pair of drive plates, rotatably received within said housing means, and respectively associated therein with the drive axle ends for rotation therewith, said drive plates being longitudinally displaced with respect to one another; and

carriage means, comprising an integral annular member disposed respectively between said housing means and each of said drive plates, for supporting thereon at least one pair of engagement means, said pair of engagement means being longitudinally displaced so as to correspond respectively with said longitudinally displaced drive plates, for transferring rotating drive power from said housing means to their corresponding drive plate upon respective contact with said housing means engagement areas; wherein

one of said drive plates may receive drive power transferred thereto via its corresponding engagement means for rotation with said housing means, while the other of said drive plates is rotated by its corresponding drive axle at a rate faster than that of said housing means;



said carriage means annular member includes a plurality of circumferential slots defined through the circumference thereof for receiving therein said engagement means in respective of such slots;

said pair of engagement means each comprise a pair of curved wedge members journaled respectively in one of said slots for limited circumferential movement therein, joined together with a spring; and

said wedge members have a concave surface forming a curvature adapted for concentric mating and frictional engagement with the outside diameter of its respective drive plate, and further have a convex surface forming a curvature adapted for interfering engagement with said housing means inwardly-projecting engagement areas, whereby rotating drive power applied to said housing means may be transmitted to a respective drive plate via simultaneous interfering engagement by one of its corresponding wedge members with an engagement area and frictional engagement of such one wedge member with such respective drive plate.

4,876,919
POWER TRANSFER DEVICE FOR FOUR-WHEEL DRIVE

Shuji Nagano, and Masaki Inui, both of Toyota, Japan, assignors to Toyota Jidosha Kabushiki Kaisha, Aichi, Japan

Filed Jul. 25, 1988, Ser. No. 223,384

Claims priority, application Japan, Jul. 24, 1987, 62-186118

Int. Cl.[4] F16H *35/04;* B60K *17/354, 17/352*

U.S. Cl. 74—650 4 Claims

1. A power transfer device adapted for use in combination with a power transmission for an automotive vehicle, comprising:

a housing;

a first shaft rotatably mounted within said housing and having an input end for drive connection to an output shaft of said power transmission and an output end for drive connection to a first set of road wheels;

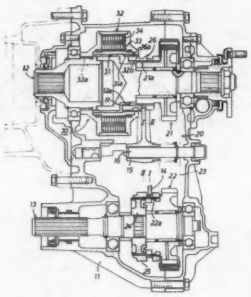
a second shaft rotatably mounted within said housing in parallel with said first shaft and having an output end for drive connection to a second set of road wheels;

a drive member rotatably mounted on said first shaft;

a driven member mounted on said second shaft for rotation

therewith and being drivingly connected to said drive member;

a limited-slip differential in the form of a viscous clutch coupling including an outer casing mounted on said first shaft for rotating therewith, an inner sleeve coupled with said outer casing in a liquid-tight manner for defining a viscous fluid chamber and for relative rotation thereto and being rotatably mounted on said first shaft, a first set of viscous coupling plates splined to an internally splined



portion of said outer casing, and a second set of viscous coupling plates splined to an externally splined portion of said inner sleeve and being interleaved with said first set of coupling plates; and

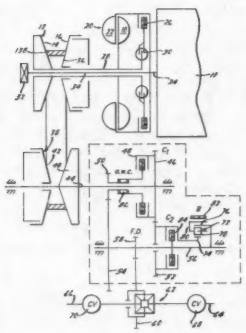
a clutch sleeve axially movably mounted on a hub portion of said drive member for rotation therewith and shiftable between a first position where it is retained to engage both said outer casing and inner sleeve of said clutch coupling and a second position where it is retained to engage only said inner sleeve of said clutch coupling.

4,876,920

DUAL RANGE INFINITELY VARIABLE TRANSMISSION

Peter Eichenberger, Livonia, Mich., assignor to Ford Motor Company, Dearborn, Mich.

Filed Jul. 7, 1988, Ser. No. 216,065
Int. Cl.[4] F16H *37/00*
U.S. Cl. 74—689 **4 Claims**



1. In a transaxle assembly comprising an infinitely variably belt and sheave assembly having driving sheave portions and driven sheave portions, a housing assembly enclosing said sheave portions;

a torque input shaft coaxially disposed with respect to the driving sheave portions, means for drivably connecting the driving sheave portions and said input shaft;

a secondary shaft having an axis in spaced parallel relationship with respect to said torque input shaft, said driven sheave portions being mounted for rotation on the axis of said secondary shaft;

a flexible drive member drivably connected to said input sheave portions and said output sheave portions, said flexible drive member engaging said input and output sheave portions at an effective pitch diameter for each sheave portion;

fluid pressure servo means for adjustably positioning said sheave portions to effect variations in the effective pitch diameters of said driving sheave portions and said driven sheave portions;

a countershaft mounted in spaced parallel disposition with respect to said secondary shaft, a bearing assembly means for journalling said countershaft in said housing assembly, a high speed range gear train and low speed range gear train connecting said secondary shaft with said countershaft;

fluid pressure operated clutch means for activating and deactivating selectively said high speed range gear train and said low speed range gear train;

planetary forward and reverse gear means disposed concentrically with respect to said countershaft including clutch means for establishing a one-to-one driving relationship through said planetary gear means and a brake for establishing a reverse drive ratio;

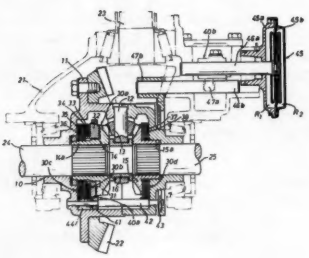
said countershaft being disposed relative to said secondary shaft so that said low speed range gear train is disposed between said driven sheave portions and said fluid pressure operated clutch means and in proximity to said secondary shaft adjacent said driven sheave portions whereby the center distance between said secondary shaft and said countershaft and the dimensions of said transaxle measured in the direction of said axis are reduced.

4,876,921

DIFFERENTIAL GEAR UNIT WITH LIMITED SLIP MECHANISM

Yasuyoshi Yasui, and Hitoshi Azuma, both of Toyota, Japan, assignors to Toyota Jidosha Kabushiki Kaisha, Toyota, Japan

Filed Jan. 13, 1988, Ser. No. 143,486
Claims priority, application Japan, Jan. 13, 1987, 62-4176[U]
Int. Cl.[4] F16H *1/44*
U.S. Cl. 74—710.5 **8 Claims**



1. A differential gear unit provided with a limited slip mechanism which comprises:

a first annular cam element integral with one side gear of the gear unit,

a second annular cam element axially slidably and rotatably mounted on a hub portion of said side gear and being engaged with said first annular cam element to be axially

displaced by its cam action when rotated relatively to said first annular cam element, and

a friction clutch mechanism including a first set of clutch discs slidably mounted on the hub portion of said side gear for rotation herewith and a second set of clutch discs axially slidably carried by a differential casea of the gear unit for rotation therewith and being interposed between the first set of clutch discs for frictional engagement therewith,

wherein a clutch ring is axially slidably mounted within said differential case in surrounding relationship with said second annular cam element, said clutch ring being formed at an inner peiphery thereof with a conical surface for frictional engagement with a corresponding conicl surface formed on an outer periphery of said second cam element.

wherein a shift mechanism is operatively connected to said clutch ring to shit said clutch ring between a disengaged position where it is disengaged from said second annularl cam element and an engaged position where it is engaged with said second annular cam element to effect relative rotation between said cam elements,

wherein said clutch ring is carried by a plurality of circumferentially equally spaced slide rods which are axially slidably mounted within said differential case, and

wherein said shift mechanism includes an axially movable shift rod arranged in parallel with said slide rods and operatively connected to said slide rods, and a actuator operatively connected to one end of said shift rod to be activated under control of a driver.

4,876,922

STEPLESS SPEED-CHANGE POWER TRANSMISSION FOR VEHICLE

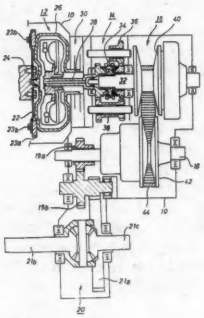
Masahiko Koshimo, Osaka, Japan, assignor to Kabushiki Kaisha Daikin Seisakusho, Osaka, Japan

Division of Ser. No. 826,037, Feb. 24, 1986, Pat. No. 4,765,200. This application May 26, 1988, Ser. No. 200,147

Claims priority, application Japan, Feb. 5, 1985, 60-20380

Int. Cl.[4] F16H *47/06, 45/02*

U.S. Cl. 74—731 **2 Claims**



1. A stepless speed-change power transmission for a vehicle having a fluid coupling, a drive plate for transmitting drive power from an engine to said fluid coupling, a forward/backward change-over mechanism coupled to a rear stage of said fluid coupling, and a stepless speed changer coupled to a rear stage of said forward-backward change-over mechanism, wherein said fluid comprises:

an external shell element (26);

a turbine wheel (52) interconnected through a turbine hub (58) to an output shaft (28);

a pump wheel (50) including a pump shell (51*b*) having an end face (93*a*) facing an inner surface of said external shell element (26) of the fluid coupling connected to said drive plate, an inner peripheral portion formed into a cylindrical shape fitting onto an outer peripheral surface of the turbine hub (58) and slidable axially thereon, an outer peripheral portion formed into a cylindrical shape surrounding said turbine wheel (52), and a facing (55*e*) secured to the end face (93*a*) forming a clutch element therewith respect to said external shell element (26) inner surface; said pump wheel (50) forming a first working oil chamber (57*a*) therewith and a second working oil chamber (51*f*) between said end face (93*a*) and said external shell element (26) whereby oil pumped into said first and second chambers acts upon said pump wheel as a piston to respectively bring said clutch element into and out of contact with said external shell element; and

a centrifugal lock-up clutch (56) fixed to said turbine wheel (52) within said surrounding outer peripheral portion of said pump wheel (50) so as to engage an inner surface of said outer peripheral portion to lock said pump wheel to said turbine wheel.

4,876,923

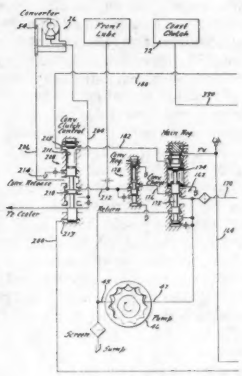
TORQUE CONVERTER LOCKUP CLUTCH CONTROL FOR AN AUTOMATIC TRANSMISSION

Scott R. Crandall, Wixom; Timothy A. Droste, Howell, and Stanley D. Rosen, Southfield, all of Mich., assignors to Ford Motor Company, Dearborn, Mich.

Filed Jul. 11, 1988, Ser. No. 217,723

Int. Cl.[4] F16H *47/00;* **F16D** *33/00, 35/00, 37/00*

U.S. Cl. 74—732 **9 Claims**



1. A converter lockup clutch system controlling an automatic transmission torque converter having an impeller adapted for driveable connection to an engine and a turbine hydrokinetically driveable connected to the impeller, comprising:

a torque converter clutch for alternately locking and releasing the impeller and turbine, having a first passage carrying converter release pressure to unlock the clutch and a second passage carrying apply pressure to lock the clutch;

a source of line pressure;

manual valve means for connecting the source of line pressure to an outlet when a low gear ratio is selected manually by a vehicle operator;

first control means for producing first control pressure states representing commands to release and to apply the torque converter; and

a converter clutch control valve means communicating with the outlet, the first control means and the source of line pressure when the first control means produces the converter release pressure state, for connecting the second passage to the source of line pressure when the first con-

trol means produces the converter apply pressure state, and for connecting the first passage to the source of line pressure when said low gear ratio is selected regardless of the pressure state produced by the first control means.

4,876,924

EXTENDED RANGE SPLITTER TYPE COMPOUND TRANSMISSION

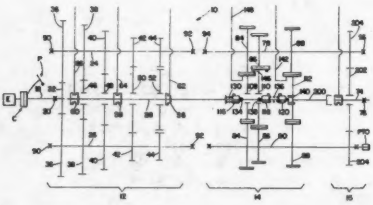
Melvern W. Fletcher, Manchester, and David G. Wylie, Bolton, both of Great Britain, assignors to Eaton Corporation, Cleveland, Ohio

Filed Aug. 1, 1988, Ser. No. 227,031

Claims priority, application United Kingdom, Sep. 21, 1987, 8722186; Nov. 7, 1987, 8726222

Int. Cl.[4] F16H *3/02*

U.S. Cl. 74—745 10 Claims



1. An extended range compound splitter type change gear transmission (10) comprising a housing (16) defining a multiple speed main transmission section (12) connected in series with a multiple speed auxiliary transmission section (14) connected in series with a multiple speed extended range section (15) said main transmission section including a selectable lowest forward speed gear ratio and a selectable reverse speed gear ratio;

said main transmission section (12) comprising an input shaft (18) having an input gear (22) rotationally fixed thereto, mainshaft (28) generally coaxial with said input shaft and extending into said auxiliary transmission section, at least one countershaft (24, 26) rotationally supported in said housing and driven by said input gear, a plurality of counter shaft gear (36, 38, 40, 42) fixed to said countershaft, a plurality of main section mainshaft gears (46, 48, 50) surrounding but not constantly engaged said mainshaft and constantly driven by said countershaft gears, and main section jaw clutch assemblies (56, 58, 60) for selectively clutching said main section mainshaft gears, one at a time, to said mainshaft;

said auxiliary transmission section (14) comprising at least one auxiliary countershaft (78, 80) rotationally supported in said housing, an intermediate shaft (200) generally coaxial with said mainshaft, said auxiliary countershaft having a plurality of auxiliary countershaft gear (84, 86, 88) fixed thereto, an output gear (112) splined to said intermediate shaft for rotational movement therewith, said output gear constantly meshed with one (88) of said auxiliary countershaft gears, at least one auxiliary mainshaft gear (108, 110) surrounding said mainshaft for rotational movement relative thereto, said auxiliary mainshaft gear constantly meshed with another (84, 86) of said auxiliary countershaft gears, auxiliary section jaw clutch assemblies (116, 118, 120) for selectively coupling said auxiliary mainshaft gear and said output gear, one at a time, to said mainshaft;

main section shifting means (72) for selectively moving said main section jaw clutch assemblies relative to said mainshaft; and

auxiliary section shifting means (144) for selectively moving said auxiliary jaw clutch assembly relative to said mainshaft, said transmission characterized by;

said extended range section (15) comprising:

an output shaft (74) generally coaxial with said mainshaft and said intermediate shaft and independently rotatable relative thereto;

a range section countershaft gear (204) fixed for rotation with said auxiliary section counter shaft (78, 80);

a range section output shaft gear (202) surrounding said output shaft and independently rotatable relative thereto;

a range section clutch (206) having a first selectable position for rotationally coupling said intermediate shaft to said output shaft and allowing said range section output gear to rotate independently of said output shaft, a second selectable position allowing independent rotation of said intermediate shaft, said output shaft and said range section output shaft gear; and and third selectable position for rotationally coupling said range section output shaft gear to said output shaft and allowing independent rotation between said intermediate shaft and said output shaft; and

range section shifting means (210) for selectively positioning said range section clutch in a selected one of the three selectable positions thereof.

4,876,925

HYDRAULIC CONTROL SYSTEM FOR AUTOMATIC AUTOMOTIVE TRANSMISSION

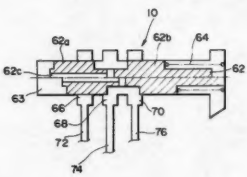
Koichi Hayasaki, Fujisawa, Japan, assignor to Nissan Motor Co., Ltd., Yokohama, Japan

Filed Apr. 25, 1988, Ser. No. 185,437

Claims priority, application Japan, Jun. 15, 1987, 62-147140

Int. Cl.[4] B60K *41/16*

U.S. Cl. 74—868 3 Claims



1. A hydraulic control circuit for a multi-speed automatic transmission for an automotive vehicle, comprising:

a source of line pressure;

a source of throttle pressure which varies with the load on a prime mover associated with the transmission;

a source of governor pressure, said source of governor pressure being arranged to produce pressure only after the speed of the vehicle has reached a predetermined value and to thereafter produce a pressure which varies with the vehicle speed;

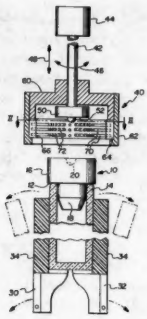
a shift valve, said shift valve having a first port in communication with said source of governor pressure and a second port in communication with said source of throttle pressure;

a throttle pressure adjustment valve, said throttle pressure adjustment valve being fluidly communicated with said source of line pressure and said source of throttle pressure, said throttle pressure adjustment valve being fluidly interposed between said source of throttle pressure and the second port of said shift valve, said throttle pressure adjustment valve being responsive to the throttle pressure from said source of throttle pressure being below a predetermined value and arranged to increase the level of throttle pressure supplied to the second port of said shift valve.

4,876,926
STOPPER REMOVER APPARATUS

Martin F. Muszak, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Feb. 14, 1989, Ser. No. 310,159
Int. Cl.[4] B67B 7/02
U.S. Cl. 81—3.2 4 Claims



1. In a stopper remover for automatically removing a stopper in a open end of an otherwise closed liquid container, the remover comprising first means for gripping said container against rotation, second means for gripping said stopper, and means for rotating said second means about an axis while said second means grips a stopper;

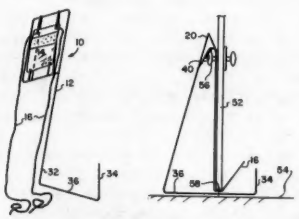
the improvement wherein said second gripping means includes engaging means for frictionally engaging a stopper while said rotating means rotates in only one direction, said engaging means comprising an annular ring and extending from the inside of said ring, a plurality of spikes terminating in ends disposed generally to form an annular surface inside of said ring constructed to engage a stopper, said spikes being mounted on said ring so as to be similarly non-radially aligned,

whereby said spikes positively grip said stopper only if said ring is rotated in said one direction, and slip off the stopper when said rotating means rotates in a direction opposite to said one direction.

4,876,927
DOOR OPENING APPARATUS AND METHOD OF USING SAME

Robert S. Mullen, P.O. Box 4533, Hayward, Calif. 94544

Filed Dec. 1, 1988, Ser. No. 278,590
Int. Cl.[4] B25B 33/00
U.S. Cl. 81—15.9 16 Claims



1. An apparatus for opening doors having a door handle, comprising:

a flexible patch having means for grasping the door handle;

an elongated rigid member having a top portion defining a frame having at least three sides, the flexible patch suspended within the frame and in balanced relation thereto: and

means connected to the patch for unbalancing the patch on the frame and for translating linear movement of the patch into rotational movement of the door handle.

4,876,928
HAMMER HEAD HAVING REMOVABLE WEIGHT COMPONENTS

Philip E. Gaulin, HCR 1, Box 174, Palenville, N.Y. 12463-9712

Filed Jul. 1, 1988, Ser. No. 214,259
Int. Cl.[4] B25R 15/00
U.S. Cl. 81—20 4 Claims

1. A new hammer head construction comprising:

a hammer head member having an elongated core recess portion which is centrally disposed in the body of the hammer head member; and,

a plurality of weighted core inserts which are dimensioned to be received in a nested fashion relative to one another within the core recess portion of the hammer head member; wherein, each of the plurality of weighted core inserts comprise individual core insert members; wherein, each of the core insert members have a different effective weight from the other core insert members; wherein, the core recess portion and the plurality of weighted core inserts have a generally rectangular configuration.

4,876,929
PORTABLE SCREW DRIVER HAVING FLEXIBLE EXTENSION SHAFT

Burton Kozak, 551 Clavey La., Highland Park, Ill. 60035

Filed Sep. 15, 1988, Ser. No. 244,334
Int. Cl.[4] B25B 13/46
U.S. Cl. 81—57.43 8 Claims

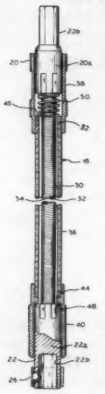
1. In a cordless portable electric screwdriver having a chuck for normally holding a tool for rotary driven motion at one end thereof, the improvement comprising:

a flexible extension shaft having a first end adapted to cooperate with said chuck and a second end adapted to hold said tool for rotary driven motion, said first end of said flexible extension shaft and said chuck having complemetarily shaped non-circular cross-sections, said chuck having an axis and being adapted to receive said first end of said flexible extension shaft by means of axial insertion of said shaft into said chuck with said non-circular cross-sections in rotationally aligned relationship and said chuck also including means for holding said first end of said flexible extension shaft for rotary driven motion of said shaft, said second end of said flexible extension shaft and said tool having complementarily shaped non-circular cross-sections, said second end of said flexible extension shaft including means for holding said tool for rotary driven motion thereof;

said flexible extension shaft normally bing disposed so as to be substantially entirely coaxial with said chuck, said flexible extension shaft being universally deflectable relative to said axis of said chuck so as to position said second

end of said shaft and said tool at an acute angle relative to said axis of said chuck, said tool being rotary driven by said cordless portable electric screwdriver through said flexible extension shaft;

said flexible extension shaft including a plurality of concentric coil springs in tightly wound adjacent relation extending between and secured to generally cylindrical body portions at said first and second ends of said shaft to accommodate universal deflection of said shaft relative to said axis of chuck, and including a flexible sleeve disposed



about said concentric coil springs, said flexible sleeve having cylindrical fittings secured thereto at opposite ends thereof so as to define a shoulder internally of each of said fittings, said cylindrical fittings each being adapted to receive one of said cylindrical body portions therein, said cylindrical body portions being spaced apart by a distance greater than the distance between said shoulders in said cylindrical fittings to permit limited axial movement of said cylindrical body portions and said concentric coil springs relative to said cylindrical fittings and said flexible sleeve.

4,876,930

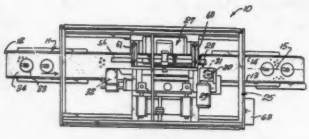
SPIN TRIMMING MACHINE WITH OBJECT POSITIONING

Alan J. Thatcher, 9182 E. Russel St., La Habra, Calif. 90631

Filed Jun. 13, 1988, Ser. No. 205,832

Int. Cl.[4] B26D *3/16;* **B23B** *3/04, 5/14*

U.S. Cl. 82—46 **12 Claims**



1. A spin trimming machine for trimming the necks of objects that have a dome molded above the trim line of the object, which machine is capable of positioning the object being trimmed in a predetermined orientation with respect to its starting orientation, said spin trimming machine comprising:

a frame;

a conveyor belt held by said frame for conveying objects to be trimmed along the machine, said conveyor belt having a central axis and a first side and a second side;

a dome-spinning belt assembly including a drive belt, a belt backup bar, and means for driving said belt along the face of the backup bar, said belt assembly being supported by said frame with the face of the belt backup bar being parallel to said conveyor belt;

a dome backup bar having a top and a bottom and having at least one elongated groove therealong, said dome backup bar being supported by said frame so that the groove is parallel to said conveyor belt and at the same height as the face of the backup bar;

an elongated knife, and knife support clamp means for holding said knife on said frame adjacent the bottom of said dome backup bar so that the position of said elongated knife is adjustable inwardly or outwardly with respect to the dome backup bar by means during the running of said machine whereby the length that the bottle will travel along the knife before the dome is cut off from the bottle may be adjusted so that the object always drops from the dome at a predetermined number of degrees.

4,876,931

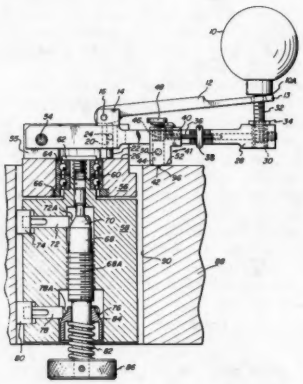
DEVICE FOR MACHINING A SEALING GROOVE ON AN ENGINE BLOCK

Millo Bertini, 679 Garden St., Trumbull, Conn. 06611

Filed Jul. 11, 1988, Ser. No. 217,290

Int. Cl.[4] B23B *5/00, 5/48*

U.S. Cl. 82—128 **14 Claims**



1. A device for machining a groove about a cylinder bore in an engine block comprising

a body portion,

means on said body portion for securing said body portion in situ within a cylinder bore of an engine block,

a laterally extending arm having a free end,

means for supporting said arm at the other end thereof on said body portion of pivoting and rotating relative said body portion,

a handle means rotatably mounted adjacent to said free end of said arm for producing said rotation of said arm relative to said body portion,

a cutting tool means for cutting a groove about the cylinder bore, said cutting tool means including a cutting tool mounted on an intermediate portion of said arm for rotation with said arm to cut said groove about said bore, and a lever pivotably mounted at one end thereof to said arm and having its other end engaging said handle means,

a fulcrum disposed intermediate said lever about which said lever is permitted to pivot relative to said arm upon the rotation of said handle means for producing rotation of said arm and causing said lever to pivot relative to said

arm for advancing said cutting tool toward the engine block during a machining operation.

13. A device for machining a groove about a cylinder bore in an engine block comprising:

a body portion,

means on said body portion for securing said body portion in situ within a cylinder bore of an engine block,

a laterally extending arm, means for pivotably connecting said arm to said body portion at one end, said arm having a free end extending radially thereof, said arm being rotatably mounted on said body portion for rotation about the cylinder bore,

a handle means rotatably journalled to said free end of said arm for producing said rotation,

a cutting tool mounted intermediate the ends of said arm for rotation with said arm to cut said groove about said bore,

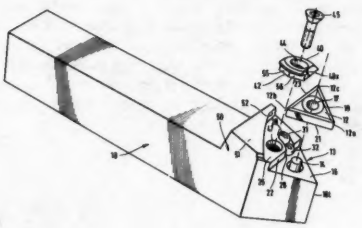
feed means connected between said cutting tool and said handle means for imparting a feed motion to said tool in addition to said rotation produced by said handle means whereby rotation of said arm by said handle means effects rotation of said handle means relative to said arm to activate said means for progressively advancing said cutting tool in said feed motion during a machining operation.

4,876,932

CUTTING TOOL HOLDER

Eliezer Nessel, Haifa, Israel, assignor to Iscar Ltd., Nahariya, Israel

Filed Aug. 16, 1988, Ser. No. 232,908
Int. Cl.[4] B23B *27/00*
U.S. Cl. 82—158 **4 Claims**



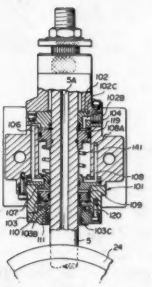
1. In a cutting tool assembly, a clamping arrangement for clamping a cutting insert to a tool holder wherein said tool holder is formed at an end thereof with an insert seat defined by a base surface and a transverse side surface; a mounting pin secured to said tool holder and extending out of said base surface so as to have mounted thereon a centrally apertured cutting insert; a ball guide groove formed in said tool holder; a plurality of clamping balls located in said groove; an upper opening of said groove extending along the length thereof in an upper surface of the tool holder adjacent to the insert seat so as to allow for ready introduction of said clamping balls into said groove; a first inner end of said groove constituting a bearing surface for an innermost of said clamping balls; a second outer end of said groove opening into said transverse side surface and having a transverse dimension less than the diameter of an outermost of said clamping balls; a groove base spaced from said upper surface in the region of said first end by a first amount less than the diameter of the innermost clamping ball and, in the region of said second end, by a second amount greater than the first amount; a ball displacing member articulated to said tool holder and juxtaposed with respect to said groove so as to bear on said innermost clamping ball and displacing means for displacing said member towards said tool holder so as to displace said outermost clamping ball into displacing said innermost clamping ball outwardly with respect to said side surface, whereby an insert mounted on said pin and resting on said base surface is clampingly pressed against said pin and is pivoted into clamping engagement with said side and base surfaces.

4,876,933

SLITTER HOLDER HAVING CLAMPING MECHANISM FOR SLITTER BLADE SUPPORT ROD

Yoshinori Tahara, Numazu, Japan, assignor to Meisan Co., Ltd., Fuji, Japan

Filed Mar. 22, 1988, Ser. No. 171,668
Claims priority, application Japan, Jun. 12, 1987, 62-146496
Int. Cl.[4] B23D *19/04*; B26D *5/04*
U.S. Cl. 83—482 **4 Claims**



1. A slitter holder having a slitter blade support rod that can be moved relative to a stationary position, said slitter holder comprising:

a moving mechanism for moving said slitter blade support rod relative to said stationary portion between a slitter blade operation position and a slitter blade rest position; and

a clamping mechanism for clamping the slitter blade support rod to said stationary portion when said slitter blade support rod is moved to said slitter blade operation position;

said moving mechanism including:

a first cylinder portion which is formed in said stationary portion and in which said slitter blade support rod is inserted;

a first piston which moves in said first cylinder portion and which is secured to said slitter blade support rod; and

a first compressed air control means which controls the supply of the compressed air to said first cylinder portion in order to control the movement of said slitter blade support rod; and

said clamping mechanism including:

a second cylinder portion which is formed in said stationary portion and in which said slitter blade support rod is inserted;

a second piston which moves in said second cylinder portion so that said slitter blade support rod slides;

a clamp member which moves together with said second piston to acquire a liberated position where the slitter blade support rod is liberated and to acquire a clamp position where the slitter blade support rod is clamped;

a clamp action member which is provided on said stationary portion and acts upon said clamp member so that said clamp member acquires said clamp position; and

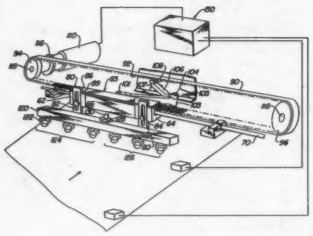
a second compressed air control means which controls the supply of the compressed air to the second cylinder portion and which, after the slitter blade support rod has moved to said slitter blade operation position, moves said second piston so that said clamp member is caused by said clamp action member to acquire said clamp position.

4,876,934

COMPUTERIZED BREAD SPLITTER

John E. Fagan, and A. Farrel Droke, both of Norman, Okla., assignors to Burford Corp., Maysville, Okla.

Filed Sep. 8, 1987, Ser. No. 93,816
Int. Cl.[4] B26D *3/08*
U.S. Cl. 83—879 8 Claims



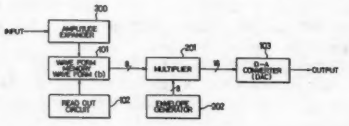
1. A hydraulic splitter for cutting a product carried on a conveyor comprising: support means adjacent the conveyor; guide means on said support means, said guide means extending transversely of the conveyor; a source of pressurized fluid; a nozzle; means operably connecting said source of pressurized fluid to said nozzle; a carriage; means movably securing said carriage to said guide means; means securing said nozzle to said carriage; a motor; a flexible belt; means drivingly connecting said motor to said belt; means securing said belt to said carriage for moving said carriage longitudinally of said guide means and transversely of the conveyor; and control means associated with said motor to move said nozzle transversely of the conveyor such that fluid dispensed from said nozzle impinges a product moved by the conveyor to form a chevron shaped pattern on the product.

4,876,935

ELECTRONIC MUSICAL INSTRUMENT

Hiroshi Kitagawa, Shizuoka, Japan, assignor to Kabushiki Kaisha Kawai Gakki Seisakusho, Hamamatsu, Japan

Filed Sep. 29, 1987, Ser. No. 102,410
Claims priority, application Japan, Oct. 4, 1986, 61-236864
Int. Cl.[4] G10H *1/02*
U.S. Cl. 84—627 4 Claims



1. An electronic musical instrument in which a natural musical tone is converted into a digital signal and at least a section of the waveform of the digital signal is compressed to a quantized waveform, stored in a memory and read out therefrom for producing a musical tone, including;

means for storing data of the compressed waveform section in the memory, wherein said compressed waveform section has had its amplitude expanded in accordance with a predetermined envelope waveform; and,

means for reading the stored amplitude-expanded digital waveform section data out of the memory and for digitally multiplying the digital waveform data read out by a digital envelope waveform, thereby reproducing the original waveform.

4,876,936

ELECTRONIC TONE GENERATOR FOR GENERATING A MAIN MELODY, A FIRST ACCOMPANIMENT, AND A SECOND ACCOMPANIMENT

Walter C. Y. Yeh, 6th Fl., No. 210, An Ho Road, Taipei, Taiwan

Filed May 9, 1988, Ser. No. 191,885
Int. Cl.[4] G10H *1/40, 7/00*
U.S. Cl. 84—612 1 Claim

1. An electronic tone generator comprising:

a main melody generation circuit, having a main melody generator and a first latch circuit, for generating a main melody signal;

a first accompaniment circuit, having a first accompaniment generator and a second latch circuit, or generating a first accompaniment signal;

a second accompaniment circuit, having a second accompaniment generator and a third latch circuit, for generating a second accompaniment signal;

first, second and third envelope circuits, respectively coupled to said main melody generator circuit, said first accompaniment circuit, and said second accompaniment circuit, for respectively waveform shaping said main melody signal, said first accompaniment signal, and said second accompaniment signal;

a memory, coupled to said first, second and third latch circuits, for storing information concerning key activation, tempo, melody, notes and timings;

a tempo generator coupled to said memory for outputting a tempo signal;

a melody generator coupled to said tempo generator for outputting a melody signal to said memory;

a control circuit coupled to said memory for controlling a generation of said main melody signal, said first accompaniment signal, and said second accompaniment signal; and

a mixing modulator, coupled to said first, second an third envelope circuits, for combining the shaped main melody signal, first accompaniment signal, and second accompaniment signal respectively output from said envelope circuits.

4,876,937

APPARATUS FOR PRODUCING RHYTHMICALLY ALIGNED TONES FROM STORED WAVE DATA

Hideo Suzuki, Shizuoka, Japan, assignor to Yamaha Corporation, Hamamatsu, Japan

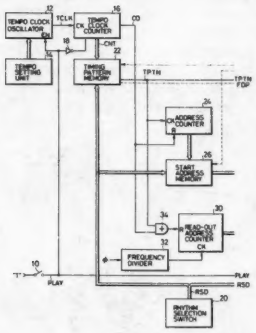
Continuation of Ser. No. 34,350, Apr. 3, 1987, abandoned, which is a continuation of Ser. No. 649,431, Sep. 11, 1984, abandoned. This application Nov. 29, 1988, Ser. No. 277,418
Claims priority, application Japan, Sep. 12, 1983, 58-167765; Sep. 12, 1983, 58-167766
Int. Cl.[4] G10H *1/40, 7/00*
U.S. Cl. 84—612 15 Claims

13. An apparatus for producing rhythm tones at a rhythm tempo rate, comprising:

memory means for storing a series of waveshapes representing an alignment of sequential rhythm tones to be produced;

readout means for reading out said waveshapes from said

memory means in sequence of the alignment according to rhythm timings and at a readout rate selected such that



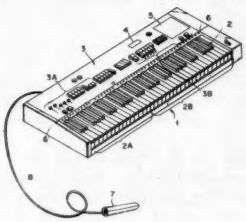
said read out waveshaped are of the same pitch independent of said tempo rate.

4,876,938

ELECTRONIC MUSICAL INSTRUMENT WITH AUTOMATIC PERFORMING FUNCTION

Isao Shinohara, Tokyo, Japan, assignor to Casio Computer Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 654,053, Sep. 24, 1984, abandoned, which is a continuation of Ser. No. 433,047, Oct. 6, 1982, abandoned. This application Dec. 16, 1988, Ser. No. 287,619
Claims priority, application Japan, Oct. 9, 1981, 56-161409
Int. Cl.[4] G10F *1/00*
U.S. Cl. 84—611 **8 Claims**



1. An electronic musical instrument with an automatic performing function, comprising:

melody tone data storing means for storing tone name, tone octave and tone interval data;

chord tone data storing means for storing chord name and chord tone interval data, said chord name data being subdivided into chord root data and chord classification data;

said melody tone data and chord tone data being stored in their respective storing means in the same format, including a common format for melody tone name data and chord root data, a common format for melody tone octave data and chord classification data, and a common format for melody tone interval data and chord tone interval data;

musical tone signal generating means including at least one output processing unit having a plurality of time-division-switched channels for producing respective musical tone signals selectively responsive to the melody tone data supplied from said melody tone data storing means and to the chord data supplied from said chord tone data storing means, said output processing unit being capable of producing one or more musical tones simultaneously, each tone in a separate time-division-switched channel;

first automatic control means for successively reading out, and supplying to said musical tone signal generating means, melody tone data stored in said melody tone data storing means;

second automatic control means for successively reading out, and supplying to said musical tone signal generating means, chord tone data stored in said chord tone data storing means; and

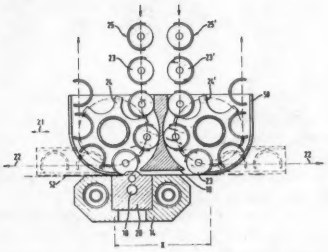
operating mode selection means coupled to said first and said second automatic control means for selecting one of several automatic operation modes among which there are, at least, one mode in which only said first automatic control means is rendered operative, one mode in which only said second automatic control means is rendered operative and one mode in which both said first and second automatic control means are rendered operative.

4,876,939

DEVICE FOR REPOSITIONING AMMUNITION FEED OF AN AUTOMATIC WEAPON

Gerhard Bilger, Lauterbach; Helmut Mader, Schramberg, and Erich Matzagg, Oberndorf/Beffendorf, all of Fed. Rep. of Germany, assignors to Mauser-Werke Oberndorf GmbH, Oberndorf, Fed. Rep. of Germany

Filed Apr. 5, 1988, Ser. No. 177,632
Claims priority, application Fed. Rep. of Germany, Apr. 7, 1987, 3711690
Int. Cl.[4] F41D *10/32*
U.S. Cl. 89—33.04 **8 Claims**



1. A device for positioning a plurality of different ammunition feeding devices which are selectively positionable between an operable position and a secured position so as to selectively feed different types of ammunition to a weapon breech, comprising a rotatable drive shaft, a shifting lever having a driving end adjacent said drive shaft and an opposite engagement end engageable with the different ammunition feeding devices, and coupling means defined between said drive shaft and said lever for rotating said lever in response to rotation of said drive shaft so as to move a selected ammunition feeding device into and out of an operable position.

4,876,940

MAGAZINE AMMUNITION CONVEYING SYSTEM

Anthony J. Aloi, Richmond; Robert R. Bernard, Essex Jct., and Edward A. Proulx, Burlington, all of Vt., assignors to General Electric Company, Burlington, Vt.

Filed Apr. 14, 1988, Ser. No. 181,756
Int. Cl.[4] F41D *10/14*; B65G *29/00*
U.S. Cl. 89—33.16 **16 Claims**

1. An article feeding system comprising, in combination:

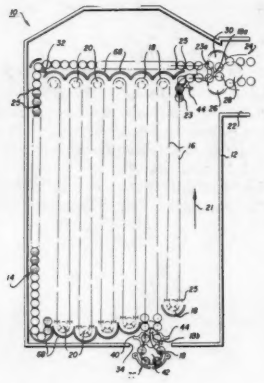
A. a magazine including at least one article transfer port therein;

B. an endless article conveyor arranged within said magazine in a serpentine formation consisting of a plurality of straight line sections and interconnecting turnaround sections, one of said turnaround sections being located at said magazine transfer port, said conveyor including

(1) a series of spaced turnaround sprockets about which said conveyor turnaround sections are trained, and

(2) a succession of article carriers, each said carrier holding a single article and including a pair of opposed, pivotally interconnected carrier halves configured to assume closed, article retentive relative positions while in said straight line conveyor sections and opened, article releasing relative positions while in said conveyor turnaround sections;

C. an article transfer station located at said magazine transfer port, said transfer station including



(1) first means operating to accelerate successive articles released by said carriers upon arrival at said one turnaround section from conveyor velocity to a transfer velocity,

(2) transfer means for accepting accelerated articles from said first means, and

(3) second means operating to decelerate successive articles accepted from said transfer means to conveyor velocity and individually deposit the decelerated articles in successive said carriers prior to departure from said one turnaround section; and

D. guides positioned at the other said turnaround sections for precluding the release of the articles from said carriers during transit through said other turnaround sections.

4,876,941

COMPOSITE FOR PROTECTION AGAINST ARMOR-PIERCING PROJECTILES

Albert L. Barnes, Wickliffe; Thomas M. Clere, Hudson, both of Ohio; Gholamreza J. Abbaschian, Gainesville, Fla., and Douglas J. Wheeler, Tolland, Conn., assignors to Eltech Systems Corporation, Boca Raton, Fla.

Filed Dec. 31, 1987, Ser. No. 140,077

Int. Cl.[4] F41H *5/00*

U.S. Cl. 89—36.02 **32 Claims**

1. An armor plate layered composite for protection against projectiles and having enhanced resistance to penetration from high kinetic energy projectiles, which armor plate comprises a metal substrate and a surface layer composite ceramic on said substrate of very finely-divided and interconnected grains of TiB_2 and AlN.

4,876,942

ANTI-AIRCRAFT SIGHT

Hans-Arne Nilsson, Ulricehamn, Sweden, assignor to Saab Instruments Aktiebolag, Jönköping, Sweden

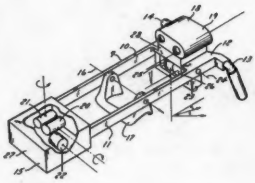
Continuation of Ser. No. 44,850, Apr. 6, 1987, Pat. No. 4,823,674. This application Mar. 13, 1989, Ser. No. 322,690

Claims priority, application Sweden, Aug. 19, 1985, 8503860

The portion of the term of this patent subsequent to Apr. 25, 2006, has been disclaimed.

Int. Cl.[4] F41G *3/06, 5/08*

U.S. Cl. 89—41.22 **2 Claims**



1. A ranging unit for a gun such as an anti-aircraft gun that is normally fired at moving targets and comprises a barrel with a barrel axis, an aiming unit which is mounted on the barrel for angular adjusting motion relative to it and which defines an aiming axis that a gunner manually maintains aligned on a target during a period terminating at an instant of firing to thus aim the barrel, and servo means reacting between the barrel and the aiming unit and responsive to outputs from a calculating device for angularly adjusting said aiming axis relative to said barrel axis in accordance with lead and offset angles needed for a projectile fired from the gun to hit the target, said ranging unit comprising:

A. a base;

B. optical means fixed on said base through which an operator can view a target and which defines a sighting axis that the operator can maintain aligned on a target by moving the base;

C. first pivoting means providing a connection between said base and said barrel whereby the base is constrained to move with the barrel but is pivotable relative to the barrel for swinging said sighting axis in azimuth and in elevation relative to said barrel axis;

D. a laser ranging device fixed on said base and connected with said calculating device, said laser ranging device being arranged

(1) to emit and receive laser beam radiations along a laser axis substantially coinciding with said sighting axis and

(2) to produce range outputs which correspond to distances from the sighting unit to a target aligned with said sighting axis and which are delivered to said calculating device as inputs for the latter;

E. means on said base for measuring values of

(1) the elevation angle of said sighting axis and

(2) the rates of change in azimuth and elevation of said sighting axis, and for producing inputs to said calculating device corresponding to those measured values;

F. a handle for imparting movements to said base; and

G. second pivoting means providing a connection between said handle and said barrel whereby the handle is constrained to move with the barrel but is movable relative to said barrel axis in directions corresponding to azimuth and elevation.

4,876,943
AUTOMATIC MACHINE GUN

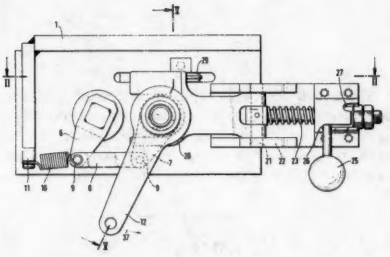
Gerhard Bilger, Lauterbach; Helmut Mader, Schramberg, both of Fed. Rep. of Germany, and Erich Matzagg, Oberndorf, Austria, assignors to Mauser-Werke Oberndorf GmbH, Oberndorf, Fed. Rep. of Germany

Filed Jul. 7, 1987, Ser. No. 70,568

Claims priority, application Fed. Rep. of Germany, Jul. 12, 1986, 3623565

Int. Cl.[4] F41D *11/02*

U.S. Cl. 89—141 **4 Claims**



1. An automatic machine gun weapon housing a housing with a stationary and a movable part, a firing mechanism in said stationary housing part for tripping a trigger for single firing and optionally for continuously firing, comprising pivotal trigger means for tripping the trigger for single firing and continuous firing optionally, including a mechanically actuated cocking lever for cocking the trigger, and a trigger plate for tripping by said cocking lever and functionally connected to said trigger, said mechanism acting to return said trigger plate to its starting position independently of the position of said cocking lever, first and second separately rotatable but relatively non-rotatable crankshafts, a crank connected to each crankshaft, a parallel link interconnecting said crankshafts for parallel movement together at a spaced location apart, a cam disk on each crankshaft aligned parallel and holding said trigger plate for stroke motion in a straight line, a coupling engageable to prevent relative rotation of coupled parts located on said first crankshaft coupled with said coupling coupling in a gear connection with axial mobility for uncoupling with the movable part of said housing moving backward and forward, a fork rotatably mounted on said housing, a return spring action on said second crankshaft acting to move it in a return direction.

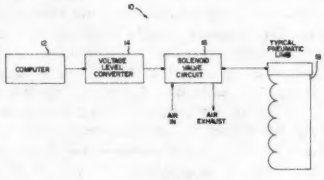
4,876,944
PNEUMATIC LIMB CONTROL SYSTEM

James F. Wilson, Durham; Rhett T. George, Jr., Hillsborough, and Zhenhai Chen, Durham, all of N.C., assignors to Duke University, Durham, N.C.

Filed Mar. 3, 1988, Ser. No. 164,061

Int. Cl.[4] F15B *21/02*

U.S. Cl. 91—35 **12 Claims**



1. A controller for a pneumatically-powered flexible limb characterized in that it provides for rapid movement of said limb from a first position to a second position with minimal overshooting of said second position, and comprising:

computer means for providing signal data corresponding to a plurality of successive events of air introduction and non-air introduction, respectively, into said flexible limb for a predetermined limb movement from a first position to a second position, wherein duration of non-air introduction relative to air introduction permits the effects of inertia to dissipate, and further wherein said signal data provide for varying the air introduction time in relation to the non-air introduction time for said successive events and the time pperiods each consisting of an air introduction event and a non-air introduction event are variable during at least a portion of the flexible limb movement from said first position to said second position;

means for converting said time-varying signal data from said computer means into correspoinding time-varying electrical signals; and

valve means pneumatically connected to said flexible limb and electrically connected to said converting means for successively opening to introduce pressurized air into said flexible limb and closing to prevent air introduction into said limb for said plurality of succesive events according to said time-varying electrical signals from said converting means.

4,876,945
PISTON AND CYLINDER UNIT

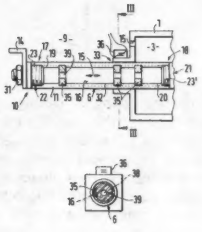
Kurt Stoll, and Lothar Müller, both of Esslingen, Fed. Rep. of Germany, assignors to Festo KG, Esslingen, Fed. Rep. of Germany

Filed Oct. 13, 1988, Ser. No. 257,387

Claims priority, application Fed. Rep. of Germany, Oct. 13, 1987, 3734547

Int. Cl.[4] F01B *25/26, 31/12*

U.S. Cl. 92—5 R **21 Claims**



18. A piston and cylinder unit comprising: a cylinder:

a piston arranged inside and being axially displaceable relative to said cylinder;

a cylinder end cover at one end of said cylinder, said end cover having a hole;

a tubular rod having a load end and a piston end, said rod having a bore extending substantially from said load end to said piston end, said bore having female threads extending from each of said ends toward the other of said ends, said rod piston end being threadably engaged to said piston, Said rod projecting away from said piston and extending through said end cover hole, said rod load end being threadably engaged to a load attachment means for attaching said rod to a load, said bore being adapted to receive a permanent magnet moving with said rod;

a switch positioned adjacent said cylinder and cooperating with said magnet, said magnets being axially adjustable in said bore.

4,876,946

FLEXIBLE HOSE PUMP

Viktor V. Shishkin, ulitsa Festivalnaya, 16, kv. 5; Nikolai F. Kryazhevskikh, ulitsa Krasnykh Partizan, 599, kv. 13, and Jury P. Shapovalov, ulitsa Turgeneva, 18, all of Krasnodar, U.S.S.R.

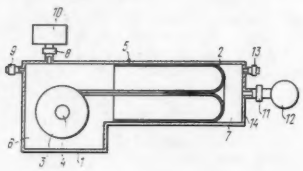
PCT No. PCT/SU86/00139, § 371 Date Jul. 27, 1987, § 102(e) Date Jul. 27, 1987, PCT Pub. No. WO87/03936, PCT Pub. Date Jul. 2, 1987

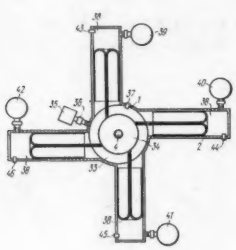
PCT Filed Dec. 19, 1986, Ser. No. 112,610

The portion of the term of this patent subsequent to Jul. 12, 2005, has been disclaimed.

Int. Cl.[4] F01B *19/00*; F16J *3/00*

U.S. Cl. 92—93 **11 Claims**





1. A pump comprising a casing **(1)** having an inner wall and an interior space having a flexible hose **(2)** mounted for reciprocation having a first end **(5)** which is turned inside out and sealingly secured along the perimeter to the inner wall of the casing **(1)** and a second end which is closed so as to sealingly divide the interior space of the casing **(1)** into two chambers **(6, 7)** wherein one chamber communicates with a source **(12)** of fluid being pumped and with a delivery line, the second end is secured to a drum operatively connected to a motor arranged in one of the chambers **(6, 7)**, to move the flexible hose in one direction, and means for effecting movement in the opposite direction by the action of a pressure of a working fluid in one of the chambers **(6, 7)**.

4,876,947

PISTONS WITH BEARING LANDS

Michael L. P. Rhodes, Rugby, England, assignor to AE PLC, Cawston, England

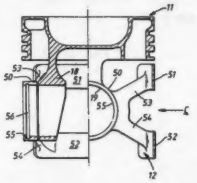
Filed Mar. 19, 1987, Ser. No. 27,876

Claims priority, application United Kingdom, Mar. 20, 1986, 8606998

Int. Cl.[4] F16J *1/14*; F22B *5/00*

U.S. Cl. 92—187 **3 Claims**

1. A piston comprising a crown portion which also includes a piston ring belt and gudgeon-pin bosses and which crown portion comprises a casting of steel or cast-iron and a separate articulated skirt portion comprising a casting of aluminum alloy, steel or cast-iron which also includes gudgeon-pin bores, said crown portion and said skirt portion having a common gudgeon-pin about which said articulated skirt portion is freely able to move relative to said crown portion, wherein portions



of the skirt which co-operate with an associated cylinder or cylinder liner comprise axially-spaced circumferentially extending bearing lands, and said circumferentially extending bearing lands are arcuate, load bearing skirt lands supported by struts depending from gudgeon-pin boss pieces of the skirt portion.

4,876,948

CONSTANT SPEED HOLDING DEVICE FOR VEHICLE

Takeshi Yasukawa; Masayoshi Onishi, and Tadayuki Fujimoto, all of Hyogo, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

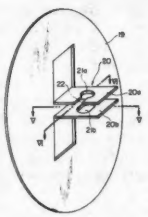
PCT No. PCT/JP87/00596, § 371 Date May 20, 1988, § 102(e) Date May 20, 1988, PCT Pub. No. WO88/01239, PCT Pub. Date Feb. 25, 1988

PCT Filed Aug. 10, 1987, Ser. No. 184,554

Claims priority, application Japan, Aug. 19, 1986, 61-126148; Aug. 19, 1986, 61-126149

Int. Cl.[4] F01B *19/02*; F16B *7/10*

U.S. Cl. 92—99 **3 Claims**

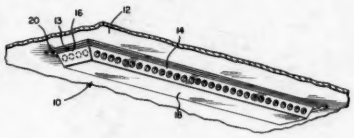


1. A cruise control device for a vehicle, including an actuator (A) having a diaphragm **(12)** and controlling a throttle valve **(8)** by transmitting movements of the diaphragm to a throttle link **(9)**, comprising: a metal connector **(19, 20)** fixedly secured to the diaphragm and having an upper plate **(20*a*)** formed with an exclusively circular through-hole **(21*a*)** and a slot **(22)** extending from a side edge of said upper plate to said circular through-hole, and a lower plate **(20*b*)** disposed parallel to said upper plate and spaced therefrom, and formed with an aperture for receiving a lower end of a circular cylindrical rod **(6*b*)**, said aperture being larger than said circular through-hole and including a projected area of said through-hole perpendicular to said lower plate, and a wire device **(6)** including a wire **(6*a*)** and said rod fixedly connected to one end of said wire, one end of said rod being inserted into said through-hole of said upper plate and another, opposite end of said rod being inserted into said aperture of said lower plate, with said wire passing through said slot during insertion, and the other end of said wire being connected to the throttle link.

4,876,949
LOW TEMPERATURE AIR INDUCTION DIFFUSER

Paul W. Fairchild, Rogersville; Jim L. Claney, Springfield; William G. Fields, Branson, all of Mo.; Louis Bishop, Jr., and Mark W. Fly, both of Lowell, Ark., assignors to Thermo-Aire Systems, Inc., Springfield, Mo.

Filed Apr. 18, 1988, Ser. No. 182,457
Int. Cl.[4] F24F *13/06*
U.S. Cl. 98—40.1 3 Claims



1. An air diffuser comprising:

a base;

first, second, third and fourth side walls extending from said base to form a hollow shell, a first pair of said side walls diverging from one another and a second pair of said side walls also diverging from one another as the side walls extend upwardly from said base, at least one of said side walls including a plurality of bores therein forming multiple discharge tubes, said multiple discharge tubes each having a longitudinal central axis disposed at an acute angle relative to a surface on which said hollow shell is secured;

said base and said side walls forming a plenum into which conditioned, pressurized air is supplied, the conditioned air being discharged from said plenum through said multiple discharge tubes in streams of air, a low pressure area caused by each air stream exiting from said multiple discharge tubes pulling air surrounding the exterior surface of said hollow shell along said surface to evaporate moisture on the surface;

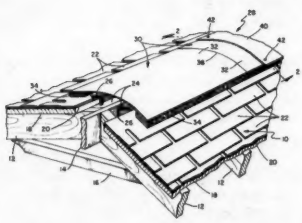
means securing said hollow shell to said surface;

said multiple discharge tubes each being spaced from the surface and discharging said streams of air away from and in acute angular relation to the surface for entraining ambient air from both above and below each column of air being discharged along the exterior of said hollow shell for mixing of ambient air with each column of the discharged conditioned air.

4,876,950
ROOF VENTILATOR

Richard D. Rudeen, 4008 Roanoke Cir. North, Golden Valley, Minn. 55422

Filed Apr. 18, 1988, Ser. No. 182,460
Int. Cl.[4] F24F *7/02*
U.S. Cl. 98—42.21 9 Claims

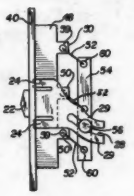


1. A roof ventilator section comprising an impervious flexible plastic membrane constituting a flat sheet conformable to different roof pitches, and a pair of laterally-spaced open cell foamed plastic strips secured to one side of said membrane, said strips having a multiplicity of interlinked filaments.

4,876,951
AIR REGISTER HANDLE ARRANGEMENT

Donald J. Vork, Holland, Mich., assignor to Hart & Cooley, Inc., Holland, Mich.

Filed Dec. 9, 1987, Ser. No. 130,622
Int. Cl.[4] F24F *13/15*
U.S. Cl. 98—107 19 Claims



17. An air register handle adapted to be mounted in air register means for regulation of air flow, said air register handle comprising:

a forward bracket;

a substantially flat and straight portion extending rearwardly from said bracket and integral therewith;

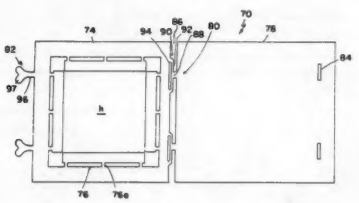
an arcuate flat portion integral with said straight portion and having a fork-shaped configuration, whereby two substantially parallel and arcuate arms form an open slot at an end of said handle opposing an end of said straight portion to which said bracket is integrally connected; and

a pair of handle tabs connected to and extending above and below said straight portion, wherein said tabs are coplanar and positioned at an acute angle of less than 90° relative to a plane of said straight portion.

4,876,952
AIR-CONDITIONING APPARATUS

Toshio Kuno; Yoshikazu Shindo; Yukio Kuno; Takeshi Ueno, all of Fukuoka; Akira Torimi, Saga, and Yoji Mori, Fukuoka, all of Japan, assignors to Kabushiki Kaisha Kyoritsu, Kasuya, Japan

Division of Ser. No. 184,013, Apr. 20, 1988. This application Feb. 10, 1989, Ser. No. 309,102
Claims priority, application Japan, May 22, 1987, 62-77574; Jul. 16, 1987, 62-178648; Sep. 8, 1987, 62-137868; Sep. 26, 1987, 62-147426; Oct. 19, 1987, 62-160641; Feb. 10, 1988, 63-29338
Int. Cl.[4] F24F *11/04*
U.S. Cl. 98—121.2 1 Claim



1. In an air-conditioning damper having a duct means forming an air passage passing through said duct means, and an airflow adjusting means provided with vanes disposed in said air passage, said vanes being independently rotatable around supporting shaft portions to adjust their angles without exter-

nal driving mechanisms such as handles and gears, an operation port apparatus provided to said duct means in the vicinity of said airflow adjusting means and comprising:

an opening formed on a wall of said duct means; and

a closure means fixed to said opening to open and close said opening,

said closure means comprising:

a frame body having an operation port corresponding to said opening;

fixing portions connected to said frame body to fix said frame body to said opening;

a cover body connected to said frame body to open and close said operation port of said frame body;

hinge portions connected to said frame body and said cover body;

tabs connected to said frame body; and

long holes provided to said cover body to receive said tabs respectively,

said closure means being integrally made from a single thin plate.

4,876,953

SIPHON COFFEE MAKER

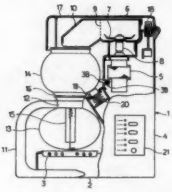
Humihiro Imamura, Seto, and Tomio Hotta, Kuwana, both of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Apr. 5, 1989, Ser. No. 333,199

Claims priority, application Japan, May 30, 1988, 63-133593; May 30, 1988, 63-133594

Int. Cl.[4] A47J *31/42, 31/12*

U.S. Cl. 99—280 **9 Claims**



1. A siphon coffee maker comprising:

(a) a lower container for containing water;

(b) a heater for applying heat to the lower container;

(c) an upper container disposed on the lower container, the upper container being provided with a water feed tube communicating to the interior of the lower container;

(d) storage means for storing data of an amount of coffee to be extracted; and

(e) control means for operating to energize the heater in response to an extracting operation command, thereby starting the extracting operation, the control means operating, after completion of the extracting operation, to supply the heater with an electrical output varied in proportion to the amount of coffee to be extracted, data of which is stored in the storage means, so that the heater is energized to execute a warmth retaining operation for the coffee extracted.

4,876,954

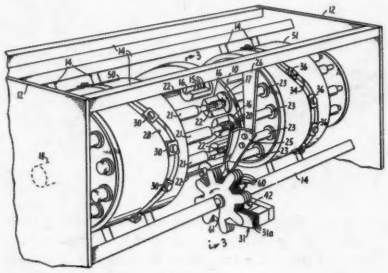
METHOD AND APPARATUS FOR PITTING AND SLICING OLIVES

Fred J. Cimperman, Castro Valley, Calif., assignor to Ashlock Company, San Leandro, Calif.

Filed Jan. 13, 1988, Ser. No. 143,822

Int. Cl.[4] A23N *4/12*

U.S. Cl. 99—545 **20 Claims**



1. An olive pitting and slicing apparatus, including:

a rotatable drive shaft;

a plate fixedly attached to the drive shaft;

a first cup dimensioned to receive an olive, and fixedly mounted on the plate so that rotation of the drive shaft will cause the plate to translate the first cup, and any olive within the first cup, along a substantially circular cup path;

a first pitting means capable of extending toward the first cup when the first cup occupies a first segment of the cup path to extract an olive pit from an olive in the first cup, wherein the first pitting means is also capable of retracting away from the first cup after extraction of the olive pit; and

a set of slicing knives non-translatably mounted adjacent a second segment of the cup path, in such a position that the slicing knives engage with and slice a pitted olive in the first cup when the first cup occupies the second segment of the cup path, wherein the drive shaft is capable of rotating in a first rotational direction so as to translate the first cup along the cup path in said first rotational direction, and also including:

a frame;

a slicing knife shaft rotatably mounted on the frame and fixedly attached to the slicing knives so that rotation of the slicing knife shaft will rotate each slicing knife; and

a slicing knife rotation means coupled to the slicing knife shaft, for rotating the slicing knife shaft and the slicing knives as a unit in a second rotational direction opposite the first rotational direction as the first cup translates through the second segment of the cup path.

16. A method for pitting and slicing an olive, including the steps of:

(a) translating a cup containing an olive along a portion of a substantially circular cup path;

(b) translating a pitting unit, including a pitting knive and a coring knife, along a path substantially parallel to the cup path;

(c) while the cup occupies a first segment of the cup path, extending the pitting knife and the coring knife from the pitting unit into engagement with the olive in the cup to extract a pit from the olive;

(d) retracting the pitting and coring knives away from the cup after the pit is extracted; and

(e) while the pitted olive remains in the cup with unchanged orientation relative to the cup, translating the cup past a set of non-translating slicing knives in such a manner that

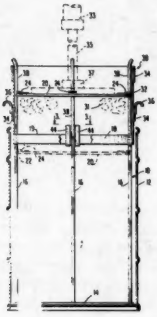
the slicing knives engage with and slice the pitted olive in the cup.

4,876,955

EXTENSION FOR COMPACTING DEVICE

O. L. Jackson, 3324 Mustang Dr., Brooksville, Fla. 33512

Filed Jul. 21, 1988, Ser. No. 222,642
Int. Cl.[4] B30B *15/00*
U.S. Cl. 100—219 **6 Claims**



1. An extension for use with a compacting device adapted to be inserted into a container wherein the compacting device comprises:

a base member,

a plurality of equally spaced threaded rods secured to the base member,

a supporting band secured about the upper ends of the rods and a plurality of plates with unidirectional locking means adapted to be inserted within the rods for compacting loose waste material and preventing springback;

said extension comprising:

a hollow tubular sleeve adapted to be supported on said supporting bands and having a plurality of smooth rods secured in spaced locations to the inner surface of said sleeve in alignment with respect to the threaded rods and locating means secured to said extension adjacent each smooth rod for engagement with a respective threaded rod to prevent rotation of said extension relative to said compacting device when used in conjunction with said compacting device.

4,876,956

REMOVABLE POSTAGE METER HAVING AN INDICIA COVER

Gilbert N. Riley, Wilton; Richard S. Holodnak, Stratford, and Richard A. Malin, Westport, all of Conn., assignors to Pitney Bowes Inc., Stamford, Conn.

Filed Oct. 27, 1987, Ser. No. 114,363
Int. Cl.[4] G07B *5/06, 17/04*
U.S. Cl. 101—91 **7 Claims**

1. A postage meter comprising:

(a) a meter housing having disposed therein a print die, said housing being removable from a postage meter base;

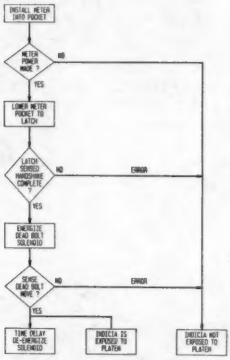
(b) microprocessor means disposed in said housing for enabling the printing of postage using said print die and for accounting for the printing of postage;

(c) means for inputting information to said microprocessor means, said inputting means including a communication port;

(d) said postage meter housing having an aperture therein adjacent said print die;

(e) a shutter mounted on said postage meter housing, said shutter covering said aperture for preventing access to the print die, said shutter being locked in position covering the aperture whenever said housing is removed from the postage meter base; and

(f) said shutter being movable upon being enabled by said microprocessor means upon predetermined communication between the postage meter base and the microprocessor means to a second position in which said aperture and thereby said die are exposed for the purpose of printing whenever said postage meter housing is locked on the postage meter base.

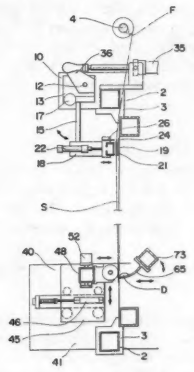


4,876,957

APPARATUS FOR APPLYING AN EMULSION SCREEN FILM OF SCREEN-PRINTING

Shigekazu Sakai, Gifu, Japan, assignor to Tokai Shoji Co., Ltd., Tokyo and Tokai Seiki Co., Ltd., Gifu, both of, Japan

Filed Sep. 14, 1987, Ser. No. 96,975
Claims priority, application Japan, Oct. 31, 1986, 61-167877[U]
Int. Cl.[4] B41C *1/14*
U.S. Cl. 101—128.4 **11 Claims**



1. An apparatus for applying an emulsion screen film of screen-printing, which comprises a support frame, means for vertically supporting on said frame a screen-printing plate with a screen surface and for holding a rolled emulsion screen film above the screen-printing plate, a swingable and vertically adjustable film guiding- and cutting-mechanism for vertically guiding and positioning the unrolled emulsion screen film in contact with said screen surface of the screen-printing plate

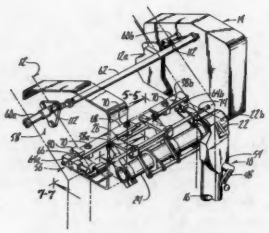
from its upper portion and for cutting the film at a predetermined length, and a pressing-and applying-mechanism for pressing the emulsion screen film against the screen surface at its lower portion and for supplying an emulsion onto an opposite side of the screen surface relative to the contacted screen side while said pressing- and-applying-mechanism is sliding upwardly in contact with the screen surface.

4,876,958

SWING APPARATUS FOR AN OFFSET PRESS AUXILIARY PRINT UNIT

Robert T. Townsend, Altoona, Iowa, assignor to Townsend Industries, Inc., Altoona, Iowa

Filed Dec. 9, 1986, Ser. No. 939,948
Int. Cl.[4] B41F *5/02, 13/12*
U.S. Cl. 101—175 **10 Claims**



1. In combination, a single-color offset printing press having a frame and single-color printing means, a second-color auxiliary print unit removably mounted on said frame in operative engagement with said single-color printing means, and a swing apparatus for selectively engaging and disengaging said auxiliary print unit from said press, the swing apparatus comprising:

swingable support means pivotally mounted on said frame for pivotal movement about a vertical axis,

securing means on said support means for detachably securing said support means to said auxiliary print unit; and

said support means including lift means to lift said auxilliary print unit out of engagement with said single-color printing means, whereby said auxiliary print unit can be lifted and then pivoted in a substantially horizontal plane from its operative position on said press to an inoperative position laterally adjacent said press.

4,876,959

DRIVE SYSTEM FOR ROTARY PRINTING APPARATUS INCLUDING IMPROVED MEANS FOR LOCKING AND UNLOCKING THE APPARATUS

John R. Nobile, Fairfield; William A. Ross, Darien, and William D. Toth, Milford, all of Conn., assignors to Pitney Bowes Inc., Stamford, Conn.

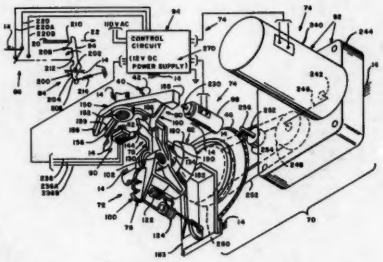
Filed Feb. 8, 1989, Ser. No. 307,804
Int. Cl.[4] B41F *13/24*
U.S. Cl. 101—233 **19 Claims**

1. In a machine including rotary means for printing indicia on a sheet fed to the machine, wherein the machine includes means for driving the rotary printing means, wherein the driving means includes a drive gear having a home position, wherein driving means includes a locking member movable into and out of locking engagement with the drive gear when the drive gear is in its home position, and wherein the machine includes trip means for sensing a sheet fed to the machine, an improvement comprising:

a. an actuating member for moving the locking member into and out of locking engagement with the drive gear;

b. means for controlling the actuating member, the controlling means including resilient means for urging the actuating member to move the locking member into and out of locking engagement with the drive gear; and

c. the trip means including means for normally latching the controlling means for preventing the resilient means from moving the actuating member to move the locking member out of locking engagement with the drive gear, and the latching means unlatching the controlling means for permitting the resilient means to move the actuating member for moving the locking member out of locking engagement with the drive gear when the trip mean senses a sheet fed to the machine.

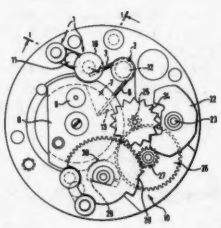


4,876,960

FUSE FOR LOW-SPIN OR NON-SPIN PROJECTILES

Wolfgang Schillinger, Schiltach; Andreas Hilsig, Denkingen, and Wolfgang Zehnder, Schramberg, all of Fed. Rep. of Germany, assignors to Gebrüder Junghans GmbH, Schramberg, Fed. Rep. of Germany

Filed Dec. 6, 1988, Ser. No. 280,359
Claims priority, application Fed. Rep. of Germany, Dec. 16, 1987, 3742575
Int. Cl.[4] F42C *9/04, 15/18, 15/24*
U.S. Cl. 102—249 **5 Claims**



1. A fuse for low spin or non-spin projectiles comprising:

a detonator carrier movable to a live position,

blocking means for normally preventing movement of said detonator carrier to said live position and being releasable in response to firing recoil to permit movement of said detonator carrier to said live position,

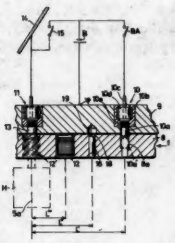
spring means operably connected to said detonator carrier and disposed in a relaxed state prior to firing recoil, and

spring-energizing recoil means operable connected to said spring means for energizing said spring means in response to firing recoil to bias said detonator carrier toward said live position, said spring-energizing recoil means comprising a recoil member arranged for movement in response to firing recoil, said recoil member including cam means arranged to displace one portion of said spring means for imparting a bias to another portion of said spring means which bears against said movable detonator carrier.

4,876,961
FUZES

Bert Åström, Degerfors, and Olof Nygårds, Karlskoga, both of Sweden, assignors to Aktiebolaget Bofors, Bofors, Sweden

Filed Oct. 6, 1988, Ser. No. 253,631
Claims priority, application Sweden, Oct. 6, 1987, 8703840
Int. Cl.[4] F42C *15/34*
U.S. Cl. 102—254 10 Claims



1. A fuze arrangement for an ammunition unit dischargeable from a gun, in which the fuze includes electronics with an associated electrical trajectory safety device for preventing arming of the ammunition unit within a trajectory safety distance, an arming igniter actuable by the trajectory safety device after the trajectory safety distance, and a movable portion which is actuable by the arming igniter for executing an instantaneous movement to move a bursting cap disposed in the movable portion to the arming position in a detonation chain including a initiation detonator actuable by means of an impact or a proximity fuze contact;

wherein the movable portion is lockable by a locking device, which is actuable on a first hit of the ammunition unit against an object located within the trajectory safety distance for preventing the movable portion from executing the instantaneous movement even if the first hit mechanically influences electronics and/or the electrical trajectory safety device to effect activation of the arming igniter, such that the ammunition unit, upon a second hit against a further object within the trajectory safety distance, assumes the safe secured position, thereby preventing total bursting of the ammunition unit by the shock-triggering of the bursting cap on the second hit.

4,876,962
PROPELLANT CHARGE FOR CANNONS AND A METHOD OF PRODUCING SUCH A CHARGE

Mats Olsson, Karlskoga, Sweden, assignor to Nobel Kemi AB, Karlskoga, Sweden

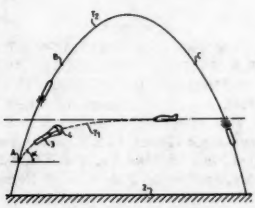
Filed Aug. 3, 1988, Ser. No. 227,565
Claims priority, application Sweden, Aug. 21, 1987, 8703246
Int. Cl.[4] C06B *45/12*
U.S. Cl. 102—288 18 Claims

1. A propellant charge for cannons, wherein it comprises a number of tubular propellant sticks (1) of large length in relation to the diameters of the propellant combustion channels included therein, each one of said tubular propellant sticks having been provided with slits or slots or incisions (4) which connect the propellant sticks outer surface with the respective combustion channel, and said propellant sticks having been densely packed to form one or more linearly disposed bundles of optional outer configuration and with a total length corresponding to at least the major fraction of the available charge space for the charge under consideration, whilst the remainder of the available charge space is taken up by loosely added, disorientated powder flakes, powder grains or short powder rods or tubes (9).

4,876,963
HIGH PENETRATION ANTI-RUNWAY BOMB

Jean Deffayet, Chaville, France, assignor to Thomson-Brandt Armements, Boulogne-Billancourt, France

Filed Aug. 15, 1988, Ser. No. 232,239
Claims priority, application France, Aug. 14, 1987, 87 11583
Int. Cl.[4] F42B *25/02*
U.S. Cl. 102—387 5 Claims

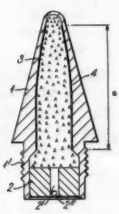


1. An anti-runway bomb intended to be released at a very low altitude, equipped with a downward propulsive unit and comprising means for braking and orienting said bomb during its initial fall so as to position the bomb in a plane, and an upward propulsive unit activated when said bomb is positioned in said plane.

4,876,964
PROJECTILE AND METHOD OF MAKING IT

Kare R. Strandli, and Svein T. Halvorsen, both of Raufoss, Norway, assignors to Raufoss A/S, Raufoss, Norway

Continuation of Ser. No. 54,787, May 25, 1987, abandoned. This application Jul. 25, 1988, Ser. No. 224,244
Claims priority, application Norway, May 29, 1986, 862128
Int. Cl.[4] F42B *13/12*
U.S. Cl. 102—499 7 Claims



1. A projectile comprising:

(a) a metallic nose portion having an inner wall defining an interior cavity with a closed forward end portion;

(b) an impact detonatable charge filling the cavity and extending into the forward end portion; and

(c) a coating formed of a material that is softer than the metal forming the nose portion applied to the inner wall so as to substantially cover the entire inner wall between the nose portion and the charge except for the closed forward end portion so as to prevent detonation of the charge cuased by low velocity impact deformation of the nose portion.

5. A method of making a projectile having reduced detonation on low velocity impact comprising the steps of:

(a) forming a nose portion of metal having an inner wall defining an interior cavity with a closed forward end portion;

(b) applying a coating to the inner wall so as to substantially cover the entire inner wall except for the closed forward end portion, the coating comprising a material softer than the metal forming the nose portion; and,

(c) filling the interior cavity with an impact detonatable charge such that the charge extends into the closed forward end portion.

4,876,965

DEVICE FOR THE CENTERING OF A RAIL IN ELEVATOR STATIONS OF ELECTRIC OVERHEAD TROLLEY CONVEYORS

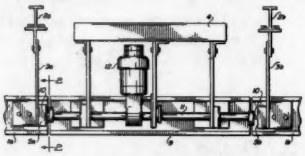
Gunter Koslowski, Soyen, and Georg Uttscheid, Rosenheim, both of Fed. Rep. of Germany, assignors to ROFA Rosenheimer Förderanlagen GmbH, Fed. Rep. of Germany

Filed Mar. 30, 1988, Ser. No. 175,102

Claims priority, application Fed. Rep. of Germany, Apr. 2, 1987, 3711043

Int. Cl.[4] B66B *17/18*

U.S. Cl. 104—127 **2 Claims**



1. A device for centering a moveable rail section relative to a stationary rail section in a lift station of a trolley conveyor comprising, a centering body attached to one of said rail sections, a centering piece attached to the other of said rail sections, said centering body having a generally vertically disposed slot therein permitting entry of said centering piece from above and below said body, said slot having oppositely disposed lateral cavities in the sidewalls thereof, said cavities being vertically displaced with respect to each other with an upper region of one cavity overlapping a lower region of the other cavity, said centering piece having an oblong cross-section and being rotatable about a central axis, the relationship between the centering body and the centering piece being such that when said centering piece is rotated to a position in which its longer dimension is disposed generally upright the centering piece can enter the slot in said centering body and when said centering piece is rotated to a position in which its longer dimension is disposed generally horizontally the centering piece occupies substantially entirely the overlapping regions of said cavities, the arrangement being such that rotation of said centering body to its horizontal position cams said moveable rail section into alignment with said stationary rail section regardless of the direction of initial displacement of said moveable rail section.

4,876,966

TRANSPORT CONTROL SYSTEM WITH LINEAR MOTOR DRIVE

Kazuyoshi Okawa, 1810-2, Kobiki-cho, Hachiouji-shi, Tokyo 193; Kazumasa Moriya, 6-4-9, Kamikizaki, Urawa-shi, Saitama 338; Tomoyuki Kashiwazaki, 4-21-1, Hosoyama, Asao-ku, Kawasaki-shi, Kanagawa 215; Hiroshi Kawashima, 4-12-25, Higashikashiwagaya, Ebina-shi Kanagawa 243-04, and Yoshitaka Murakawa, 3-16-29, Nishihara-cho, Fuchu-shi, Tokyo 183, all of Japan

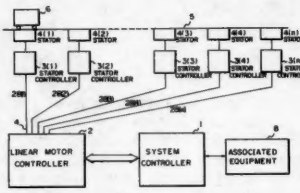
Continuation of Ser. No. 708,586, Mar. 5, 1985, Pat. No. 4,721,045. This application Jun. 8, 1987, Ser. No. 60,081

Claims priority, application Japan, Mar. 6, 1984, 59-043590; Mar. 6, 1984, 59-043591

The portion of the term of this patent subsequent to Jan. 26, 2005, has been disclaimed.

Int. Cl.[4] H02K *41/00*; B60L *15/22*

U.S. Cl. 104—290 **5 Claims**



1. A transport control system with linear motor drive comprising:

a rail-path for providing a route of transport;

a carrier driven along said rail-path by linear motor drive;

a plurality of stator portions coupled to said rail-path to produce a driving force in association with said carrier; and

a main controller for deriving a plurality of optimum velocities of said carrier at stator portions from an ideal speed control characteristic curve and for sending velocity data of said optimum velocities to stator portions respectively;

each of said stator portions including a stator controller for controlling the driving of said carrier, said main controller having means for multiple address transmission of the optimum velocities and means for sending to each respective said stator controller information indicating rail configuration, and said stator controller having means for rail configuration selection, said stator controller selects an optimal velocity of said carrier on the basis of the selection by said rail configuration selection means or the information indicating the rail configuration from said main controller and the velocity data from said main controller.

4,876,967

TRANSPORTER FOR PLANT TRAYS

Robert Postma, Towaco, N.J., assignor to Orie VanWingerden, Pompton Plains, N.J.

Filed Sep. 6, 1988, Ser. No. 240,716

Int. Cl.[4] B61C *11/00*; B61D *15/12*

U.S. Cl. 105—30 **10 Claims**

1. For a plurality of juxtpositioned plant trays movably supported on elongate beams, a transporter for moving said plurality, in unison, along said beams, comprising:

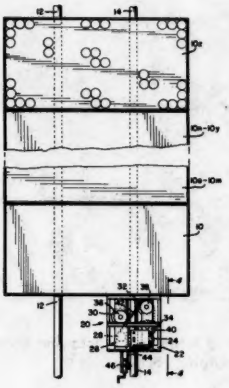
a frame fastened to one of such trays;

first means fastening each of said trays together for coincidentmovement;

second means, supported on said frame, for grippingly engaging one of said beams; and

third means, secured to said frame, for moving said beam-engaging means along said one beam; wherein

said first means comprises means (a) fastened to a foremost tray of said plurality thereof, (b) fastened to a rearmost



tray of said plurality, and (c) in traverse of trays intermediate said foremost and rearmost trays.

4,876,968

CONTAINER CARRYING RAILROAD CAR WITH IMPROVED SUPPORT SYSTEM

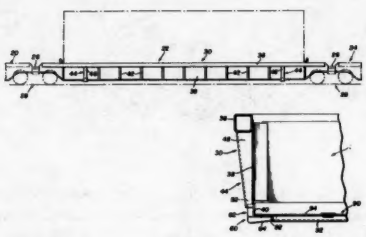
Thomas W. Lindauer, Dyer, Ind., and Richard E. Jamrozy, Lansing, Ill., assignors to Thrall Car Manufacturing Company, Chicago Heights, Ill.

Continuation of Ser. No. 890,284, Jul. 29, 1986. This application May 23, 1988, Ser. No. 197,647

The portion of the term of this patent subsequent to Sep. 20, 2005, has been disclaimed.

Int. Cl.[4] B61D *3/20, 17/10*

U.S. Cl. 105—415 **6 Claims**



1. A railroad car for carrying containers comprising:

a car body supported by rail truck means adapted for movement over a railroad;

the car body having opposing side walls and an end wall near each end, spaced longitudinally inward of the truck means and connected to the side walls with said side walls and end walls defining a well in which a container can be received;

means for supporting the bottom of a container, when in the well, comprising a plurality of separate individual spaced metal reinforcements joined to each side wall and spaced inward of the well end walls; and

each metal reinforcement having a substantially vertical leg joined at the bottom of and being entirely adjacent a side wall and the reinforcement having an arm extending laterally substantially horizontally inward toward the center of the car on which a container bottom can be supported.

4,876,969

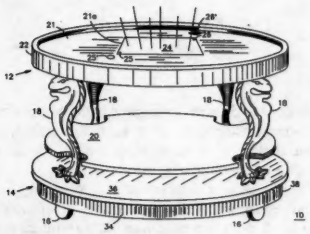
ROLLING DISPLAY TABLE FOR ICE SCULPTURES AND THE LIKE

Vittorio Infanti, Staten Island, N.Y., assignor to Infanti Chair Manufacturing Corp., Staten Island, N.Y.

Filed May 13, 1988, Ser. No. 193,908

Int. Cl.[4] A47B *85/00*

U.S. Cl. 108—24 **6 Claims**



1. A display table for displaying perishable food and the like upon a bed of ice comprising:

hollow upper and lower display table housings;

decorative legs mounted upon said lower housing for supporting the upper housing at a spaced distance above said lower housing;

a plurality of casters being mounted to and just below said lower housing for facilitating rolling movement of said display table;

said upper housing having a recessed display surface which recessed surface is relatively shallow and is watertight for receiving a bed of ice therein;

said lower housing containing a watertight tank fully concealed within said lower housing and having receiving openings;

said recessed display surface having a plurality of drain holes;

flexible drain tubes coupled between said drain holes and receiving openings provided in said tank and running along and substantially concealed by an associated one of said legs for providing means for continuously carrying water away from the recessed display surface and formed due to melting of the ice while at the same time not distracting from the aesthetic appearance of the display table and especially the decorative legs thereof;

said shallow recessed display surface being provided with a centrally located opening;

a transparent member being fitted within said opening to provide a substantially watertight fit between said display surface and said transparent member;

said upper housing having a hollow illumination means receiving region; and

illumination means being provided beneath said transparent member and within said upper housing illumination means receiving region and being secured to said upper housing and beneath said transparent member for providing light which passes through said transparent member.

4,876,970

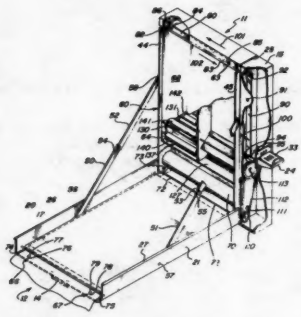
COIN OPERATED INFANT CHANGING TABLE

Wendy Bolduc, 5285 Elmhurst St., Ventura, Calif. 93003

Filed Jul. 29, 1988, Ser. No. 225,829

Int. Cl.[4] A47B 3/00

U.S. Cl. 108—35 10 Claims



1. A coin operated infant changing table comprising:

a wall housing attachable to a vertical surface, said wall housing including a dispensing means for storing and dispensing convenience products;

a cover unit, defining a table surface, pivotally secured to said wall housing and rotatable between a closed position against said wall housing and an extended position in which said cover unit extends outwardly from said wall housing to support said table surface horizontally;

a pair of hinged support members coupled between said wall housing and said cover unit and forming protective side members adjacent said table surface in said extended position;

coin means for locking said cover unit to said wall housing in said closed position and releasing said cover unit when a predetermined combination of coins are received within said coin means; and

operating means coupled to said cover unit and said dispensing means, said operating means dispensing a convenience product each time said cover unit is rotated from said closed position to its extended position.

4,876,971

WATER COOLED INCINERATOR

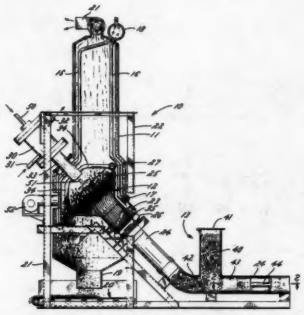
Chadwell O'Connor, 2024 Galaxy Dr., Newport Beach, Calif. 92660

Filed Aug. 29, 1988, Ser. No. 237,981

Int. Cl.[4] A47J 36/00, 36/24

U.S. Cl. 110—246 4 Claims

1. An incinerator comprising, in combination, a firebox, a funnel shaped burning chamber having a cylindrical portion and open end, said burning chamber rotatably supported in said firebox on an angle so that the lowermost conical portion of the chamber is substantially horizontal, a material receiving chute mounted outside of said firebox and opening into a cylindrical feeding tube, the cylindrical portion of said burning chamber extending through said firebox and being aligned with said feeding tube, a combustion air supply extending into said firebox and ending in a nozzle for driving air into the open end of the conical portion of the burning chamber, means for rotating said chamber about its axis, and means for forcing



material from said feeding tube into and up the cylindrical portion of said burning chamber.

4,876,972

GRATE BAR ELEMENT FOR A SLIDING GRATE FURNACE FOR GARBAGE INCINERATION

Louis Mrklas, c/o Fam. Löer, Feledstr. 21, D-4352 Herten, Fed. Rep. of Germany

Filed Apr. 21, 1988, Ser. No. 184,378

Claims priority, application Fed. Rep. of Germany, Apr. 25, 1987, 371608

Int. Cl.[4] F23H 3/00

U.S. Cl. 110—298 6 Claims

1. Grate bar element for a sliding grate furnace for garbage incineration, where the bar elements are adapted to be arranged lying one on the other like roof tiles and have at their ends openings for the escape of combustion air, characterized in that

for multiple circulation of the material (3) to be incinerated each grate bar element (1) has at least two skid surfaces (9, 10) which are limited at their ends by step-like lugs (22, 22a) or shoulders,

the air outlet openings are provided in each lug (22, 22a) of the grate bar element (1) and are formed, for horizontal or parallel supply of combustion air onto the adjacent next skid surface (9 or 10), as air outlet slots (5, 6) which extend over largely the total width of the grate bar element (1), and

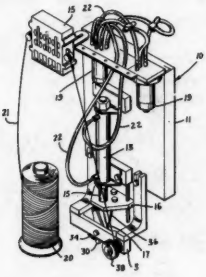
for heat removal each grate bar element (1) is subdivided vertically by an inner longitudinal center web, at which air passages (23, 24) for the supply of combustion air to the air outlet slots (5, 6) are formed on both sides.

4,876,973

METHOD OF AND APPARATUS FOR BLIND TUFTING COMPOSITE LAMINATED JOINTS

Albert A. Marrache, Smyrna, and Frank C. Snipes, Jr., Marietta, both of Ga., assignors to Lockheed Corporation, Calabasas, Calif.

Filed Sep. 4, 1984, Ser. No. 647,062
Int. Cl.[4] D05B *21/00*
U.S. Cl. 112—121.16 19 Claims



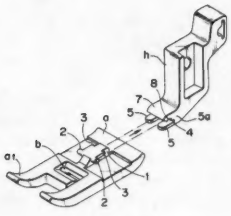
1. A self-threading stitching device for joining uncured composite laminates comprising a machine platform, a vertically reciprocating needle shaft mounted on said platform, means for imparting reciprocating motion to said needle shaft, a thread feeding means operating synchronously with the needle shaft, means for synchronizing the movement of said thread feeding means with the movement of said shaft and self-threading needle means adapted to pick up thread on its down-stroke and to carry said thread through said uncured composite laminate as said needle means penetrates said laminate, said needle means being further adapted to release said thread in said laminate as the needle shaft begins its upward stroke so that a thread loop is left protruding from that side of the composite laminate which is the opposite side from needle entry.

4,876,974

SNAP FIT PRESSER FOOT ASSEMBLY FOR A SEWING MACHINE

Manabu Ando, Asou, Japan, assignor to Kohshin Seimitsu Kikai Kabushiki Gaisha, Tokyo, Japan

Filed Dec. 22, 1988, Ser. No. 288,231
Claims priority, application Japan, Jan. 5, 1988, 63-470
Int. Cl.[4] D05B *29/00*
U.S. Cl. 112—240 1 Claim



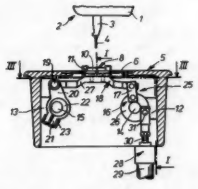
1. A presser foot assembly in a sewing machine comprising: a presser foot "a" comprising a cambered press plate having a needle aperture "b", a guide rise 1 located behind the needle aperture "b" and integrally connected to an upper surface of the cambered press plate "a", opposite side extensions 3, 3 integrally connected to the opposite side edges of a top surface of the guide rise 1 and a catch pin 2 integrally connected to a front portion of the top of the guide riser 1 and extending laterally beyound the opposite side extensions 3, 3; and a holder "h" which is adapted to be fixed to a body of the sewing machine, said holder "h" having a curved front extension, which curved front extension has a lateral and longitudinal slot 4, 6 to define two opposite resilient pieces 5, 5 and a fitting space, which fitting space is wide enough to perimit the insertion of the opposite side extensions 3, 3 of the guide rise 1, and is high or large in vertical dimension, compared with the thickness of the opposite side extensions 3, 3 of the guide rise 1, and further said curved front extension having two opposite recesses 8, 8 facing the opposite resilient pieces 5, 5 to permit the catch pin extending portion 2 to snap in the spaces defined by the recesses 8, 8 and the underlying opposite resilient pieces 5, 5 allowing said presser foot to freely incline about its pivot within controlled limits.

4,876,975

SEWING MACHINE WITH A NEEDLE PLATE INSERT

Oskar Braun, Hochspeyer, Fed. Rep. of Germany, assignor to Pfaff Industriemaschinen GmbH, Fed. Rep. of Germany

Filed Jul. 5, 1988, Ser. No. 215,248
Claims priority, application Fed. Rep. of Germany, Jul. 24, 1987, 8710148
Int. Cl.[4] D05B *73/12*
U.S. Cl. 112—260 9 Claims



1. An apparatus for adjusting the position of a surface of a needle plate insert which has a needle insertion hole therethrough, relative to the surface of a needle plate which has a recess in which the needle plate insert is movably positionable, comprising an insert carrier movable backwardly and forwardly and having first and second opposite ends, the needle plate insert having a hole therethrough for the passage of a needle, the needle plate insert being connected to said carrier and being positionable in the recess of the needle plate, a first pivotal member articulated to said first end of said insert carrier, a second pivotal member articulated to said second end of said insert carrier, adjustment means pivotally connected to the second pivotal member to raise and lower said carrier and thereby adjust the height of the needle plate insert surface relative to the needle plate, and a rocker arm operatively connected with shifting means, said rocker arm being pivotally mounted to said first pivotal member, said shifting means moving said rocker arm to raise and lower said first end of the needle plate insert carrier to move the surface of said insert carrier between an operating position in which the surface is above said needle plate and a rest position in which the surface of said insert is below said needle plate surface.

4,876,976

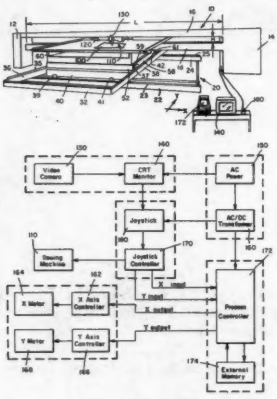
AUTOMATIC QUILTING MACHINE AND METHOD FOR SPECIALIZED QUILTING OF PATTERNS WHICH CAN BE CONTROLLED BY A REMOTE JOYSTICK AND MONITORED ON A VIDEO SCREEN INCLUDING PATTERN DUPLICATION THROUGH A REPROGRAMMABLE COMPUTER

David Brower, Tarzana, and Thomas K. Jernigan, Canoga Park, both of Calif., assignors to TD Quilting Machinery, Burbank, Calif.

Continuation-in-part of Ser. No. 220,734, Jul. 18, 1988. This application Sep. 22, 1988, Ser. No. 247,696

Int. Cl.[4] D05B *21/00, 11/00*

U.S. Cl. 112—262.3 35 Claims



32. The method of repetitively sewing a pattern into a fabric having a large surface comprising:

a. positioning a sewing machine head having a source of thread and a sewing needle relative to said fabric;

b. retaining said fabric on a movable structure which can be made to move in a horizontal direction relative to the sewing needle and which can cause a portion of the surface of the fabric to be reached by the sewing needle so that thread can be sewn into the fabric;

c. obtaining an electronically generated video image of the intersection of the sewing needle and fabric;

d. controlling the movement of the movable structure relative to the sewing needle by a remote control apparatus and determining the direction of movement based upon the video image of the intersection of the sewing needle and fabric; and

e. storing the information on the movement of the movable structure into the memory of a process controller;

f. whereby the process controller can cause the movement of the movable structure relative to the sewing needle to be subsequently repeated at any multiplicity of locations on the fabric.

4,876,977

SELECTED PATTERN DISPLAY DEVICE OF SEWING MACHINE

Takumi Ando, and Takayuki Kawasato, both of Tokyo, Japan, assignors to Janome Sewing Machine Company Limited, Japan

Filed Apr. 22, 1988, Ser. No. 184,851

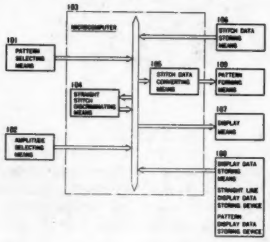
Claims priority, application Japan, Apr. 24, 1987, 62-99694; Mar. 11, 1988, 63-56121

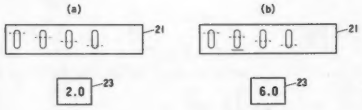
Int. Cl.[4] D05B *3/02*

U.S. Cl. 112—445 4 Claims

1. A selected pattern display device of a sewing machine having a laterally elongated needle dropping hole of a predetermined range formed in a needle plate thereof, within which a vertically reciprocating needle may be swingable from minimum to maximum so that a straight stitch pattern and various zigzag patterns of variable amplitudes may be selectively produced, including pattern selecting means selectively operated to select stitch data for a stitch pattern selected from a plurality of different patterns including a straight stitch pattern stored in pattern storage means, amplitude selecting means selectively operated to select a numeral value for determining an amplitude of the selected pattern, and display means for displaying the selected pattern and the amplitude determining numeral value for the selected pattern, said selected pattern display device comprising:

(a) means for discriminating if the selected pattern is the straight stitch pattern, said discriminating means producing a signal when the selected pattern is the straight stitch pattern;





(b) memory means storing groups of display data for graphically displaying a plurality of patterns showing in different combinations the laterally elongated needle dropping hole and a needle position determined with respect to said needle dropping hole for producing a series of straight stitches, said memory means being responsive to said signal from said discriminating means and said numeral value produced from said amplitude selecting means to produce one of said groups of display data to said display means to thereby display therein one of said graphic patterns; and

(c) stitch data converting means responsive to the stitch data for the straight stitch pattern read out from said pattern storage means and to said numeral value produced from said amplitude selecting means to determine the needle position with respect to said laterally elongated needled dropping hole in accordance with said numeral value produced from said amplitude selecting means.

4,876,978

COUPLING BETWEEN TWO PARTS WHICH ARE MOVABLE WITH RESPECT TO EACH OTHER

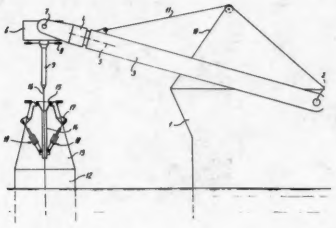
Geoffery O'Nion, Monte Carlo, Monaco, and Jean C. Gramet, Beaulieu, France, assignors to Single Buoy Moorings Inc., Marly, Switzerland

Filed Jul. 11, 1988, Ser. No. 217,225

Claims priority, application Netherlands, Jul. 10, 1987, 8701637

Int. Cl.[4] B64G *1/64*

U.S. Cl. 114—230 5 Claims



1. Coupling for performing a connection between a vessel and a mooring device, comprising a pin pivotably suspended from one of said vessel and mooring device as well as a receiving unit on the other of said vessel and mooring device with guide means for receiving the pin to perform said connection between said vessel and said mooring device; the improvement wherein the receiving unit is a substantially vertical sleeve which is swingably suspended about at least two perpendicular axes, which sleeve below its place of suspension is connected to at least two lockable struts distributed about the axis of the sleeve and adapted to allow or block respectively the swinging movements of the sleeve, said struts comprising cylinder-piston units having liquid spaces mutually connected by a hydraulic circuit having shut-off valves, which valves in their open position allow the flow of liquid from one said unit into at least one other said unit to allow free swinging movement of the said sleeve and which in the closed position block the pistons within their respective cylinders, said struts being connected with the body supporting the sleeve through the intermediation of a buffer.

4,876,979

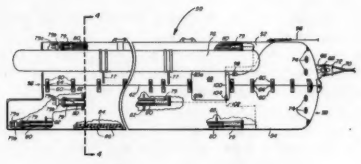
APPARATUS FOR DEPLOYING AND RECOVERING A SEABORNE VESSEL

Jim M. Walton, and Arthur E. Munson, both of San Diego, Calif., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Jan. 11, 1988, Ser. No. 142,898

Int. Cl.[4] B63B *21/66*

U.S. Cl. 114—258 23 Claims



1. An apparatus for shipboard deployment and recovery of a seaborne vessel, comprising:

muzzle means for selectively gripping the exterior of the vessel and retaining the vessel so that the vessel may be towed;

cocoon means having a hollow interior, a bow end, and a stern end, the stern end being open for receiving the muzzle means and attached vessel into the interior of the cocoon;

first tensile means connected to the muzzle means, the tensile means being threaded through the aperture in the bow end of the cocoon for towing the muzzle and vessel retained therein in the cocoon; and

second tensile means connected to the cocoon for towing the cocoon; and

inflatable resilient bladder means mounted in the interior of the cocoon for snugly engaging and retaining the vessel within the cocoon and for providing the vessel with shock attenuation protection upon introduction of pressurized fluid therein.

4,876,980

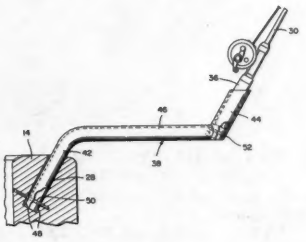
FISHING ROD HOLDER EXTENSION

Randall R. Bell, III, 4135 Baisden Dr., Pensacola, Fla. 32503

Filed Nov. 22, 1988, Ser. No. 274,834

Int. Cl.[4] A01K *97/00*; B63B *17/00*

U.S. Cl. 114—364 12 Claims



10. In combination with a boat including opposite side gunnels and a transom extending between and interconnecting the aft ends of said gunnels, at least one of said gunnels including an upwardly and outwardly inclined upwardly opening fishing rod handle receiving socket, a generally Z-shaped extension including substantially parallel and relatively longitudinally offset elongated first and second end portions and an angled connecting member extending between and rigidly connecting adjacent ends of said end portions, the end of one of said end portions remote from said connecting member being removably telescopically received in said socket, a fishing rod including handle and tip ends and having the handle end thereof removably telescopically received in the end of the other end portion remote from said connecting member.

4,876,981

BICYCLE SAFETY FLAG

Jill P. Barnhart, 2837 E. Arden Ln., Merced, Calif. 95340

Filed Oct. 8, 1987, Ser. No. 106,628

Int. Cl.[4] G09F *17/00*

U.S. Cl. 116—173 14 Claims

1. A bicycle safety flag comprising:

a mounting pole adapted for fastening to a bicycle frame at one end, rising substantially vertically from that end; and

a body mounted at the opposite end of the mounting pole having a flexible plastic upper perimeter frame, a fabric sheet stretched over the frame, the fabric sheet having an upper perimeter supported by the frame and a bottom

edge not supported by the frame, and a vertical sleeve along the fabric sheet spaced apart from the ends of the

frame into which the mounting pole can be inserted for mounting the body to the mounting pole.

4,876,982

APPARATUS FOR THE APPLICATION OF LIQUID ADHESIVES TO A SUBSTRATE

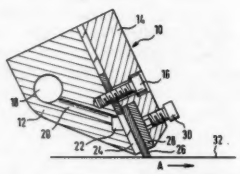
Henning J. Claassen, Industriegebiet Hafen, 2120 Lüneburg, Fed. Rep. of Germany

Filed Jun. 6, 1988, Ser. No. 202,611

Claims priority, application Fed. Rep. of Germany, Jun. 30, 1987, 3721593

Int. Cl.[4] B05C *1/04*

U.S. Cl. 118—406 10 Claims



1. An apparatus for the application of liquid adhesives to a substrate, comprising:

a supply container for the adhesive;

a conduit connected to said supply container;

an applicator nozzle defining a slit-shaped outlet opening and connected to the supply container via said conduit;

a supply passage;

a spreading chamber connected to said slit-shaped outlet opening via said supply passage;

a doctor blade of sheet metal being arranged at the slit-shaped outlet opening; and

a clamp support securing said doctor blade to said nozzle at said slit-shaped outlet opening, said clamp support including an engaging clamp plate connected to said nozzle with a clamp screw.

4,876,983

PLASMA OPERATION APPARATUS

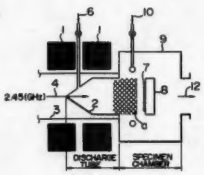
Takuya Fukuda, Hitachi; Yasuhiro Mochizuki, Katsuta; Naohiro Momma, Hitachi; Shigeru Takahashi, Hitachiota; Noboru Suzuki, Hitachi; Tadasi Sonobe, Iwaki; Kiyosi Chiba, and Kazuo Suzuki, both of Hitachi, all of Japan, assignors to Hitachi, Ltd. and Service Engineering Co. Ltd., both of Tokyo, Japan

Filed Jan. 19, 1988, Ser. No. 145,371

Claims priority, application Japan, Jan. 19, 1987, 62-8062; Mar. 2, 1987, 62-45259; Mar. 6, 1987, 62-50090

Int. Cl.[4] C23C *16/00, 14/00*

U.S. Cl. 118—722 18 Claims



1. A plasma operation apparatus comprising:

a discharge tube forming a part of discharge space and into which a discharge gas is admitted;

magnetic field generation means for generating a magnetic field within the discharge space in said discharge tube;

means for introducing a microwave into the discharge space in said discharge tube; and

a specimen chamber coupled to said discharge tube and housing a specimen stand for holding a specimen to be operated,

said magnetic field has magnetic flux density having the shape of distribution which substantially monotonously decreases, starting form the microwave incident space, toward said specimen stand,

wherein a resonance conditioning position at which said magnetic field and microwave cooperate together to cause electron cyclotron resonance is located at least partially within said specimen chamber.

4,876,984

APPARATUS FOR FORMING A THIN FILM

Mikio Kinoshita, Kawasaki; Wasaburo Ohta, Yokohama, and Toru Miyabori, Kawasaki, all of Japan, assignors to Ricoh Company, Ltd., Tokyo, Japan

Filed Jun. 9, 1988, Ser. No. 204,279

Claims priority, application Japan, Jun. 12, 1987, 62-146554; Jun. 12, 1987, 62-146555

Int. Cl.[4] C23C *8/36, 14/32, 16/50*

U.S. Cl. 118—723 7 Claims

1. An apparatus for forming a thin film comprising;

a vacuum container evacuated to high vacuum and receiving a gas for vapor deposition therein,

a source of evaporation disposed within said container for evaporating a substance to be evaporated,

a counter electrode disposed within said container and holding a substrate to be vapor-deposited such that said substrate opposes said source,

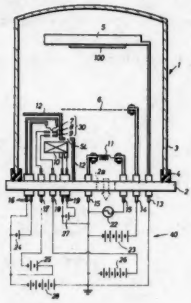
a grid disposed between said source and said electrode for allowing said evaporated substances to pass therethrough and accelerating said evaporated substances,

an electronic gun disposed within said container for emitting thermions, which are hit on said evaporated substances existing between said source and said electrode to ionize said evaporated substances,

a guiding means for deflecting electromagnetically a path of said emitted thermions and guiding said emitted thermions toward a space in the vicinity of said grid,

a shielding member disposed within said container for pre-

venting a direct impact, onto said substrate, of particles including said thermions emitted from said gun, and



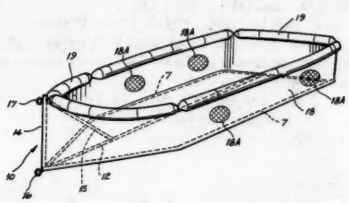
a slit disposed in said shielding member for allowing said guided thermions to pass therethrough and arrive at said space.

4,876,985

METHOD OF AND APPARATUS FOR BREEDING AND/OR RAISING SHELL FISH SUCH AS GIANT CLAMS

Bruce Marcum, and Robert C. Reynolds, Bayview Heights, both of Australia, assignors to Pacific Clam Pty. Ltd., Australia

Filed Apr. 24, 1987, Ser. No. 42,157
Claims priority, application Australia, Apr. 24, 1986, PH5615
Int. Cl.[4] A01K *61/00*
U.S. Cl. 119—4 **9 Claims**



4. A larvae tank for growing and raising fertilized eggs of shell fish, such as giant clams, said larvae tank comprising a base frame having a substantially flat support platform for the support of growing shell fish, a flexible non-rigid sheet material side wall extending upwardly from the perimeter of the base frame, the entire support platform being substantially rigid, a ring of buoyant material extending around the upper edge of the side wall adapted to support the tank when floating in water, and anchor means arranged to locate the tank at a desired position relative to the sea bed.

4,876,986

HEAT REGENERATOR TO RECOVER BOTH SENSIBLE AND HEAT OF CONDENSATION OF FLUE GASES

Arthur F. Johnson, Boulder, Colo., assignor to Energy Conservation Partnership, Ltd., Boulder, Colo.

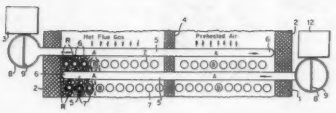
Division of Ser. No. 885,902, Jul. 15, 1986, Pat. No. 4,703,794. This application Sep. 11, 1987, Ser. No. 96,183
Int. Cl.[4] F28F *21/08, 13/12*
U.S. Cl. 122—20 B **3 Claims**

1. A heat regenerator for recovery of heat from fossil fuel boiler flue gases, comprising:

(a) a closed loop of piping of a corrosion-resistant material containing recirculating water, water in a first end of said loop being heated by exposure to said flue gases, and water in a second end of said loop being cooled by air subsequently supplied to a fossil fuel boiler for combustion, whereby said combustion air is preheated by said flue gases;

(b) means for forcibly circulating said water in said loop;

(c) plural sections of tubing containing boiler feedwater



being physically exposed to said flue gases for reheating said feedwater using the heat of said flue gases; and

(d) a bed of members sized to ensure turbulent flue gas flow surrounding said plural sections of tubing exposed to said flue gases and said first end of said loop of piping;

whereby relatively efficient heat transfer between said flue gases, said water in said closed loop, and said boiler feedwater is ensured.

4,876,987

SYNTHETIC GAS COOLER WITH THERMAL PROTECTION

Michael C. Martin; Beth E. McCracken, and George M. Gulko, all of Houston, Tex., assignors to Texaco, Inc., White Plains, N.Y.

Filed Jun. 27, 1988, Ser. No. 211,934
Int. Cl.[4] F22B *37/38*
U.S. Cl. 122—504.2 **7 Claims**

1. In a heat exchange apparatus for treating a stream of a hot, particulate carrying gas, said apparatus including:

an elongated shell having an inlet port for receiving said hot particulate carrying gas, and having an outlet port for discharging cooled, substantially particle free gas,

a water wall positioned in said elongated shell defining a heat exchange chamber having a downstream end and being spaced from said shell to form an annular passage,

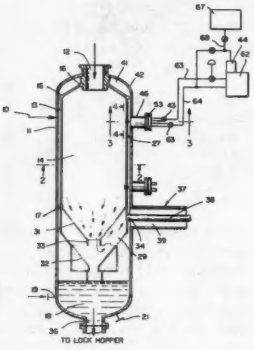
passage means communicating said inlet port with said heat exchange chamber to introduce hot, particulate carrying gas to the latter, and

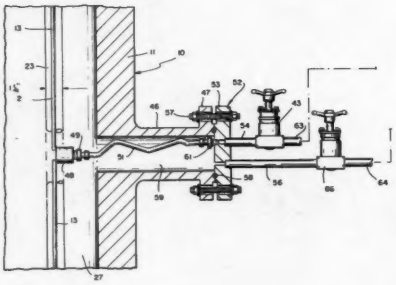
cross passage means communicating the heat exchange chamber downstream end with said discharge port and with said annular passage, respectively, the improvement therein of

a pressure monitoring system associated with said heat exchange apparatus and including

means forming a gas pressure differential indicator,

first conduit means communicating said heat exchange chamber with said gas pressure differential indicator and





second conduit means communicating said annular passage with said gas pressure differential indicator.

4,876,988

COMBINED FUEL ENGINE

Marius A. Paul, and Ana Paul, both of 967 La Paz, Placentia, Calif. 92670

Filed Jun. 13, 1988, Ser. No. 206,229

Int. Cl.[4] F02B *75/12*

U.S. Cl. 123—1 A **10 Claims**

1. A combined fuel engine for reduced emission pollution comprising:

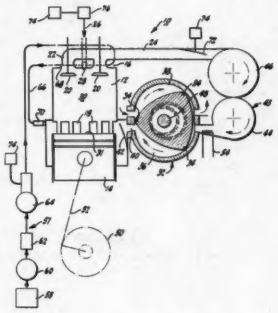
a cylinder with at least one piston reciprocal therein with a cycle having at least a compression stroke and a power stroke, the cylinder and piston forming in part a combustion chamber,

an air intake port and a combustion gas exhaust port communicating with the combustion chamber,

first fuel injection means with a first fuel supply for injecting a first conventional fuel from the high carbon group including gasoline and diesel oil stored in the first fuel supply into the combustion chamber proximate the cycle time of peak compression at the end of the piston compression stroke, and

second fuel injection means with a second fuel supply for injecting a second auxiliary fuel from the high hydrogen group including methanol, ethanol and liquefied natural gas stored in the second fuel supply into the intake port of the combustion chamber proximate the cycle time of low compression at the beginning of the piston compression stroke after the exhaust port is closed, the second fuel supply including a fuel supply line to the intake port that includes means for cooling hot areas of the engine while preheating the fuel before injection into the combustion chamber,

means for varying the proportion of fuel injection from the first fuel injection means from 100% to 5% of fuel required for a lean combustible mixture and concurrently



varying the fuel injected from the second fuel injector means to provide a fuel charge that provides the balance of fuel required for such lean combustible mixture wherein the fuel charge from the second fuel injector means is maintained sufficiently lean to prevent premature detonation, wherein detonation results upon injection of fuel by the first injection means.

4,876,989

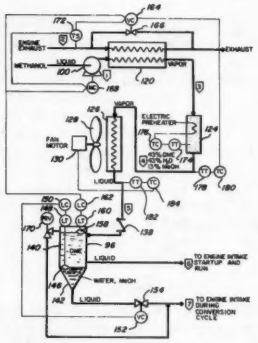
ENHANCED PERFORMANCE OF ALCOHOL FUELED ENGINE DURING COLD CONDITIONS

Michael E. Karpuk, Boulder, and Scott W. Cowley, Lakewood, both of Colo., assignors to Technology Development Associates, Inc., Wheat Ridge, Colo.

Filed May 10, 1988, Ser. No. 192,243

Int. Cl.[4] F02B *43/08*

U.S. Cl. 123—3 **41 Claims**



1. Apparatus for enhancing performance of an internal combustion engine under cold conditions, said apparatus comprising:

generating means for generating ether from alcohol onboard a vehicle having said internal combustion engine thereon, said generating means including dehydration means having vaporizing means for receiving said alcohol, superheater means for receiving said vaporized alcohol

and heating the same to the alcohol reaction temperature, and catalytic means for receiving said heated vaporized alcohol and causing said ether to be generated therefrom; and

application means for applying said ether to said engine whereby at least one of cold starting and cold operation of said engine can be effected.

4,876,990

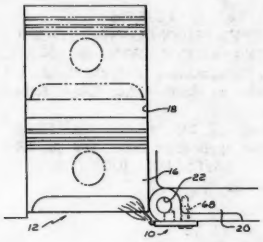
SPRAY NOZZLE ASSEMBLY FOR PISTON COOLING

David H. Hodgkins, Granby, and Leon P. Janik, Suffield, both of Conn., assignors to Stanadyne Automotive Corp., Windsor, Conn.

Continuation-in-part of Ser. No. 203,439, Jun. 7, 1988, abandoned. This application Sep. 30, 1988, Ser. No. 251,906

Int. Cl.[4] F01P *3/08*

U.S. Cl. 723—41.35 **15 Claims**



10. A nozzle assembly for cooling the crown of a piston in an internal combustion engine, comprising:

housing means having a first end and an opposing second end and integrally forming a transversely protruding inlet well defining an inlet opening intermediate said first and second ends;

cover plate means having a first end and an opposing second end, the cover plate means being secured to set housing means so that said cover means cooperates with said housing means to define a passageway from said well to the first ends of the housing means and cover plate means;

an intermediate plate member located between and substantially coextensive with housing means and the cover plate means, and having first and second ends adjacent the first and second ends of the housing means and an orifice substantially coaxial with respect to the inlet well;

a nozzle tip member having one end mounted in said passageway and another end projecting from the housing means and adapted to discharge fluid in a predetermined spray pattern;

valve means comprising a valve member interposed between the inlet opening and said passageway and captured between said housing means and said intermediate plate means to interrupt the passage of fluid from said inlet opening to said nozzle tip member when said fluid has a pressure below a preestablished threshold;

wherein one of the housing means and cover plates means includes integral retaining flanges being bent around and against the other of said housing means and cover plate means to secure the housing means, cover plate means, intermediate plate member and nozzle tip member in assembled relationship.

4,876,991

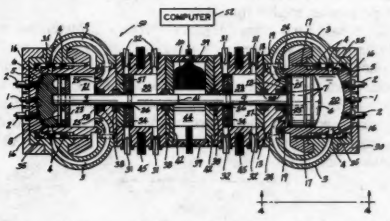
TWO STROKE CYCLE ENGINE

Kenneth A. Galitello, Jr., P.O. Box 25, Torrington, Conn. 06790

Filed Dec. 8, 1988, Ser. No. 281,530

Int. Cl.[4] F02B *71/00*

U.S. Cl. 123—46 E **25 Claims**



1. For use in a free-piston two stroke cycle engine, a piston rod assembly comprising a rigid unitary connecting rod having first and second ends and a longitudinal center, first and second power pistons mounted on said first and second ends, respectively, said connecting rod having, substantially at said longitudinal center, a circumferential groove therearound, said groove providing a slot for use in determining the position and velocity of said piston rod assembly, and first and second power transfer pistons of high strength permanent magnet material rigidly mounted on said connecting rod at first and second locations, respectively, said first location being between said groove and said first end and said second location being between said groove and said second end.

4,876,992

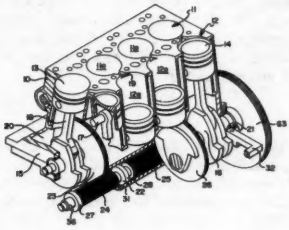
CRANKSHAFT PHASING MECHANISM

Rafal A. Sobotowski, Bay Village, Ohio, assignor to Standard Oil Company, Cleveland, Ohio

Filed Aug. 19, 1988, Ser. No. 234,561

Int. Cl.[4] F02B *75/04*

U.S. Cl. 123—48 R **7 Claims**



1. In a VCR engine having two crankshafts which rotate about parallel axes, one or more pairs of pistons with one piston in each pair linked to one of the crankshafts and the other piston in each pair linked to the other crankshaft, the pistons in each pair operating in interconnected cylinders, a phase adjuster mechanism including an axially movable adjuster member and two pairs of helical phasing gears, said member rotatable about an axis parallel to the axes of rotation of the crankshafts and supported by radial sliding bearings, each pair of said phasing gears consisting of a phasing gear fixedly mounted on a respective one of said crankshafts and a respective wider phasing gear operatively engaged therewith and fixedly mounted on the adjuster member, the respective helix angles and directions of helices of said phasing gears

being arranged to alter the phase relation between the two crankshafts in response to axial displacement of the adjuster member, the combination comprising:

an engine block;

connecting rod means operatively associated with the crankshafts;

each of said crankshafts together with the connecting rod means associated therewith sweeping a respective envelope during engine operation;

each of said two phasing gears on said adjuster member bounded by a respective imaginary cylindrical surface whose axis coincides with and whose points are equidistant from the axis of rotation of said adjuster member, and whose diameter is equal to the outside diameter of said phasing gear bounded thereby and which extends axially along the length of said engine block without intersecting said envelopes.

4,876,993

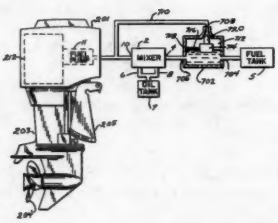
FUEL SYSTEM WITH VAPOR BYPASS OF OIL-FUEL MIXER HALTING OIL PUMPING

Gordon C. Slattery, Omro, Wis., assignor to Brunswick Corporation, Skokie, Ill.

Filed Jul. 12, 1988, Ser. No. 217,655

Int. Cl.[4] F02B *33/02*

U.S. Cl. 123—73 AD **6 Claims**



1. A marine propulsion system comprising an outboard two cycle internal combustion engine, a fuel tank, an oil tank, an oil-fuel mixer having a fuel inlet receiving fuel from said fuel tank, an oil inlet receiving oil from said oil tank, and an oil-fuel outlet delivering an oil-fuel mixture to said engine, a vapor separator coupled to said mixer and removing fuel vapor from said fuel, wherein said vapor separator is connected between said fuel tank and said mixer.

4,876,994

HYDRAULIC PLAY COMPENSATION ELEMENT

Walter Speil, Ingolstadt; Bolko Schuseil, Erlangen, and Dieter Schmidt, Nuremberg, all of Fed. Rep. of Germany, assignors to INA Walzlager Schaeffler KG, Fed. Rep. of Germany

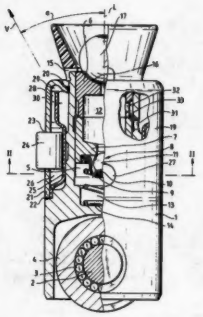
Filed Apr. 14, 1989, Ser. No. 337,952

Claims priority, application Fed. Rep. of Germany, Apr. 30, 1988, 3814700

Int. Cl.[4] D01L *1/24;* F15B *15/08*

U.S. Cl. 123—90.5 **10 Claims**

1. A hydraulic play compensation element for the drive of a valve of an internal combustion engine comprising a housing in which a hollow piston is mounted so as to be acted upon by oil pressure via a non-return valve, the hollow piston being surrounded by an oil reservoir which communicates via an oil passage with the inner space of the hollow piston and in which a sleeve is inserted which forms with a part of its wall an oil transfer channel between an oil inlet in the housing and an upper region of the reservoir, characterized in that the sleeve has a shaped section in which an anti-torsion body is propped which is inserted in a recess of the housing, the sleeve covers the oil reservoir against the recess and the oil transfer channel opens into the oil reservoir at a first circumferential point which is located higher than other circumferential points in the



torsion-proof assembled position of the play compensation element when the longitudinal axis (L) is in a slanting position.

4,876,995

VALVE OPERATION CONTROL DEVICE FOR INTERNAL COMBUSTION ENGINE

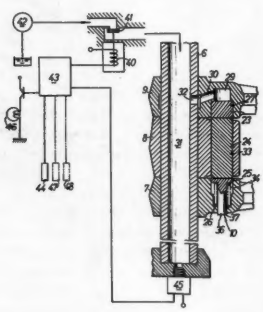
Yutaka Otobe, Saitama, and Noriyuki Kishi, Tokyo, both of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Jun. 23, 1988, Ser. No. 210,409

Claims priority, application Japan, Jun. 25, 1987, 62-158491

Int. Cl.[4] F01L *9/02, 1/34*

U.S. Cl. 123—90.12 **13 Claims**



1. In a valve operation system for an internal combustion engine having a selective coupling mechanism for operating an engine operating valve in one of a plurality of opening and closing modes of operation dependent on the level of hydraulic pressure applied to said mechanism, a control valve disposed between said selective coupling mechanism and a hydraulic pressure source for varying the level of hydraulic pressure supplied to said mechanism, and control means for controlling the operation of said control valve dependent upon the operating conditions of said engine, means for determining the operability of said valve operation system comprising:

a hydraulic pressure detector for detecting the level of hydraulic pressure supplied to said selective coupling mechanism;

means for imparting to said control means a signal representative of the respective modes of operation of said control valve;

means for imparting to said control means signals representa-

tive of the level of pressure detected by said hydraulic pressure detector; and

said control means including means for comparing the signals imparted thereto by said two signal imparting means for determining whether said signals correspond to each other.

4,876,996

DEVICE FOR THE VALVE CONTROL GEAR OF AN INTERNAL COMBUSTION ENGINE

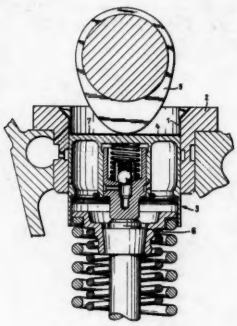
Ernst Mayer, Grossenseebach; Norbert Geheeb, Bamberg, and Uwe Köhler, Aidlingen, all of Fed. Rep. of Germany, assignors to INA Walzlager Schaeffler KG, Fed. Rep. of Germany

Filed Mar. 7, 1989, Ser. No. 319,957

Claims priority, application Fed. Rep. of Germany, Mar. 23, 1988, 3809702

Int. Cl.[4] F01L *3/04, 1/14, 1/16*

U.S. Cl. 123—90.51 **6 Claims**



1. A device for the valve control gear of an internal combustion engine a surface of which acts as a stop face for a cam, characterized in that a chromium coating is applied to the stop face, the maximum thickness of this coating being 5 μm.

4,876,997

SELF-ADJUSTING HYDRAULIC VALVE TAPPET

Helmut Zorn, and Georg Schaeffler, both of Herzogenaurach, Fed. Rep. of Germany, assignors to INA Walzlager Schaeffler KG, Fed. Rep. of Germany

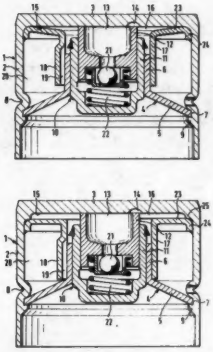
Filed Feb. 27, 1989, Ser. No. 316,467

Claims priority, application Fed. Rep. of Germany, Mar. 26, 1988, 3810436

Int. Cl.[4] F01L *1/14, 1/24*

U.S. Cl. 123—90.52 **8 Claims**

1. A self-adjusting hydraulic valve tappet arranged in a guide bore of a cylinder head of an internal combustion engine against whose one end face a cam abuts and whose other end face lies against a valve stem whereby the valve tappet comprises a cup-shaped housing made up of a hollow cylindrical wall closed at one end by an end member against whose outer surface the cam abuts and in which a guide sleeve is arranged concentrically with the hollow cylindrical wall, the guide sleeve being integrally formed at its end away from the end member with a disk member which at its outer periphery verges into the hollow cylindrical wall of the housing and which guide sleeve at its other end is at a distance from the end member where in an actual play compensating element is mounted in the guide sleeve for longitudinal displacement and is comprised of an inner piston and an outer overlapping piston placed within one another for longitudinal displacement, and together defining a high-pressure oil reservoir connected with a central oil reservoir by a bore in the inner piston closed by a check valve, the central oil reservoir being located in the inner piston and defined by the wall of the inner piston and by the inner surface of the end member of the housing against which the inner piston sits close with its end face whereas the outer piston is mounted in the cylindrical guide sleeve for longitudinal displacement and lies against the end of the valve stem with its closed end wherein an annular oil reservoir is defined by the hollow cylindrical wall, the guide sleeve, the actual play compensating element, the end member and the disk member and fed with oil through a bore leading to the outside and wherein



a sleeve starting from the end member is provided which overlaps the guide sleeve and extends to near the disk member forming a channel between the sleeve and the guide sleeve which permits the transfer of oil from the annular oil reservoir to an annularspace defined by the sleeve and the inner piston, characterized in that the sleeve is provided at its end adjacent to the end member with an outwardly directed radial flange extending to the hollow cylindrical wall.

4,876,998

CRANKCASE FOR INTERNAL COMBUSTION ENGINES

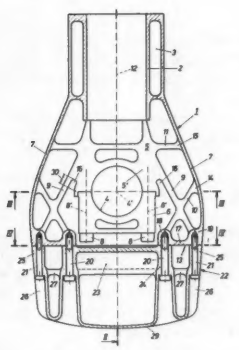
Peter Wünsche, Graz, Austria, assignor to 501 AVL Gesellschaft fur Verbrennungskraftmaschinen und Messtechnik MbH, Graz, Austria

Filed Sep. 19, 1988, Ser. No. 245,829

Claims priority, application Austria, Sep. 22, 1987, 2404/87

Int. Cl.[4] F02B *77/00*

U.S. Cl. 123—198 E **5 Claims**



1. A crankcase for an internal combustion engine, comprising main crankshaft bearing walls and sidewalls, said bearing walls comprising main bearing seats and main lower bearing

caps, said sidewalls extending below said caps, an oilpan having sidewalls connected by crosspieces in alignment with said main bearing walls, said crosspieces each having an omega-shaped cross-section opening toward the bottom and being integral with the oilpan sidewalls so as to be torsionally rigid, first bolts for connecting the oilpan to the crankcase sidewalls, pockets in said crosspieces spaced inwardly of said crankcase sidewalls for the reception of second bolts for further connecting the oilpan to said bearing walls.

4,876,999

TWO-STROKE ENGINE

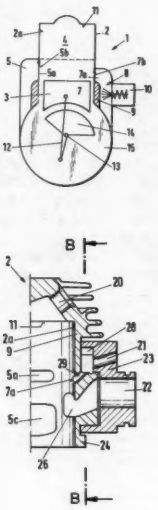
Roland Schierling, Affalterbach, and Werner Geyer, Waiblingen, both of Fed. Rep. of Germany, assignors to Andreas Stihl, Waiblingen, Fed. Rep. of Germany

Filed Oct. 24, 1988, Ser. No. 261,779

Claims priority, application Fed. Rep. of Germany, Oct. 22, 1987, 3735710

Int. Cl.[4] F02B *75/02*

U.S. Cl. 123—252 **6 Claims**



1. A two-stroke engine, especially for portable handheld tools such as a chain saw, the engine comprising:

a cylinder having a top base wall and side wall terminating in said base wall;

a piston mounted in said cylinder so as to be movable along said side wall between top dead center and bottom dead center;

said cylinder and said piston conjointly defining a combustion chamber wherein heat is generated during the operation of the engine;

a crankcase disposed beneath said cylinder;

fresh air channel means for conducting fresh air into said combustion chamber and defining a fresh air port terminating in said side wall at a first distance from said base wall so as to be closed off by said piston while the latter is at least at said top dead center;

overflow channel means for conducting an air/fuel mixture into said combustion chamber and defining a mixture port terminating in said side wall at a second distance from said top base wall greater than said first distance thereby causing said fresh air port to open before said mixture port during the downward movement of said piston from said top dead center toward said bottom dead center;

a vaporization chamber formed in said overflow channel means so as to receive fresh air therein when said mixture port opens and having a first wall defined by said side wall of said cylinder so as to be common to both said combustion chamber and said vaporization chamber thereby becoming heated by said heat;

said vaporization chamber being disposed adjacent to said top base wall of said cylinder and having a second wall disposed opposite said first wall; and,

injection nozzle means mounted in said second wall for applying fuel to said first wall thereby causing the fuel applied thereto to vaporize and form said air/fuel mixture with the fresh air received in said chamber.

4,877,000

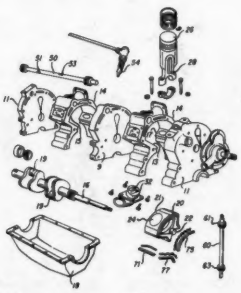
INTERNAL COMBUSTION ENGINE

Thomas Y. Lee, P.O. Box 8801, Tamuning, Guam 96911

Filed May 25, 1988, Ser. No. 198,361

Int. Cl.[4] F22B *17/10, 9/06*

U.S. Cl. 123—292 **9 Claims**



1. An internal combustion engine comprising:

a member mounted on trunnions for pivoting movement internally of said engine,

a cylinder formed as a bore extending through said member,

a piston mounted for reciprocating movement internally of said cylinder,

a precombustion chamber associated with said cylinder and adapted to receive a mixture of fuel and compressed air, and

igniter means adapted to fire said mixture in said precombustion chamber, whereby said member provides means external of said cylinder for compressing and transferring air to said precombustion chamber.

4,877,001

FUEL VAPOR RECOVERY SYSTEM

Dean R. Kenealy, and Robert W. Aittama, both of Livonia, Mich., assignors to Ford Motor Company, Dearborn, Mich.

Filed Aug. 17, 1988, Ser. No. 233,104

Int. Cl.[4] F02M *39/00*

U.S. Cl. 123—519 **18 Claims**

1. A fuel vapor recovery assembly comprising:

adsorption means for releasably absorbing fuel vapor;

housing means comprising

an elongate hollow body for housing said adsorption means having an open end, end closure means forming a fluid tight seal with said open end of said hollow body and having a first port therethrough for communicating fuel vapor into and out of said housing means, and

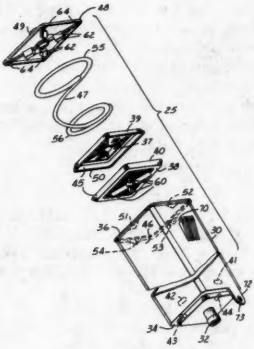
a second port remote from said first port and in fluid communication with the atmosphere,

wherein said first port and said second port are in fluid commu-

nication with each other within said housing means through said adsorption means;

first barrier means within said housing means for separating said adsorption means from said first port, allowing fluid communication between said first port and said adsorption means;

second barrier means within said housing means for separating said adsorption means from said second port and for allowing fluid communication between said second port and said adsorption means;



said housing means, first barrier means and second barrier means cooperating to contain said adsorption means;

biasing means comprising a coil spring positioned intermediate said end closure means and said first barrier means for biasing said barrier means against said adsorption means to place said adsorption means in compression; and

inwardly opening groove means in an inside surface of said hollow body proximate said end closure means for receiving corresponding portions of a coil of said coil spring.

4,877,002

ELECTRONIC CONTROL DEVICE FOR INTERNAL-COMBUSTION ENGINES

Setsuhiro Shimomura, and Ryoji Nishiyama, both of Hyogo, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Dec. 16, 1987, Ser. No. 133,890

Claims priority, application Japan, Dec. 17, 1986, 61-301986; Dec. 17, 1986, 61-301987

Int. Cl.[4] F02D *41/16*

U.S. Cl. 123—339 **3 Claims**

1. An electronic control device for an internal combustion engine of a motor vehicle, comprising:

means for sensing the number of revolutions per minute (rpm) of said engine;

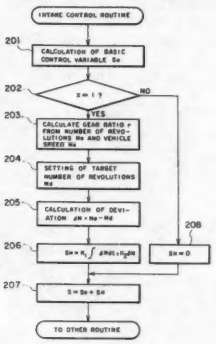
means for sensing a minimum loaded condition of said engine;

means for controlling the quantity of air intake into said engine;

control means for applying a correction signal to said means for controlling, said correction signal including at least one of an integral value and a proportional value of a difference between said number of rpm sensed by said sensing means and a target number of rpm, to adjust the quantity of air intake into said engine such that said difference will decrease, when said sensed rpm and said vehicle speed are within a predetermined range and said engine is in said minumum loaded condition;

said integral value and proportional value being multiplied by an integral gain and a proportional gain respectively to obtain said correction signal; and

means for sensing a variable speed ratio of said engine or a ratio of said sensed rpm to said vehicle speed and chang-



ing at least one of said integral gain and said proportional gain in accordance with the sensed ratio.

4,877,003

RPM CONTROL DEVICE FOR INTERNAL COMBUSTION ENGINE

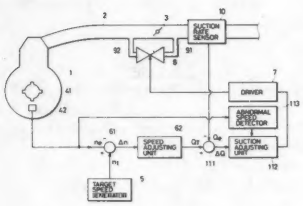
Setsuhiro Shimomura, and Yukinobu Nishimura, both of Hyogo, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Nov. 24, 1987, Ser. No. 124,520

Claims priority, application Japan, Nov. 24, 1986, 61-280420

Int. Cl.[4] F02D *41/16, 41/18*

U.S. Cl. 123—339 **10 Claims**



1. An rpm control device for an internal combustion engine comprising:

speed adjusting means for providing a target suction rate of said engine according to a speed of said engine and a target speed of said engine;

a suction rate sensor arranged in a suction path of said engine, for providing an electrical output corresponding to a suction rate of said engine;

suction adjusting means for providing an adjusting signal according to a value which is obtained by integrating the difference between an output of said suction rate sensor and said target suction rate;

control valve means for changing a suction rate of said engine substantially in proportion to said adjusting signal;

driver means for driving said control valve means according to said adjusting signal; and

abnormal speed detecting means for resetting said value obtained through integration to a reference value when the speed of said engine is abnormally decreased.

4,877,004

INTERNAL COMBUSTION ENGINE FOR A VEHICLE

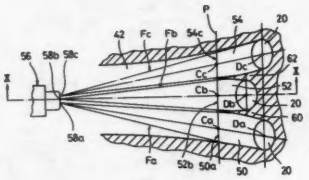
Hiroyuki Nishizawa, Kyoto, Japan, assignor to Mitsubishi Jidosha Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Dec. 12, 1988, Ser. No. 283,227

Claims priority, application Japan, Dec. 18, 1987, 62-192081[U]

Int. Cl.[4] F02B *15/00*

U.S. Cl. 123—432 9 Claims



1. An internal combustion engine for a vehicle which has at least one combustion chamber, said engine comprising:

port means defining three intake ports opening into said combustion chamber;

an intake valve unit for opening and closing said three intake ports;

passage means defining an intake passage connected to said combustion chamber through said three intake ports;

partition wall means for dividing the lower-course region of said intake passage on the intake-port side into three separate branch intake passages leading to said individual intake ports; and

a fuel injection valve disposed on the upper course side of said branch intake passages of said intake passage and adapted to inject a fuel into said intake passage,

said fuel injection valve including an injection end face fronting the inside of said intake passage and three jets through which atomized fuel flows of substantially equal quantities are injected toward said branch intake passages corresponding thereto, said jets being formed in said injection end face.

4,877,005

FUEL INJECTION PUMPING APPARATUS

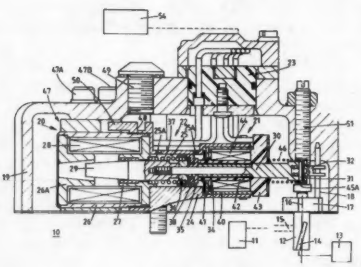
David J. C. Law, London, and Lukhbir S. Panesar, Feltham, both of Great Britain, assignors to Lucas Industries Public Limited Company, Birmingham, England

Filed Mar. 20, 1989, Ser. No. 326,155

Claims priority, application United Kingdom, Mar. 25, 1988, 8807137

Int. Cl.[4] F02M *38/00*

U.S. Cl. 123—458 6 Claims



1. A fuel injection pumping apparatus for supplying fuel to an internal combustion engine comprising a high pressure fuel pump to which fuel is supplied through an angularly adjustable throttle member from a low pressure pump, an axially movable connecting rod, one end of said rod being coupled to said throttle member by means of a link which is pivotally coupled to said one end of the rod and to an arm integral with the throttle member, an electromagnetic actuator for moving the rod in response to a control signal supplied by an electronic control system, the actuator moving the throttle member in a direction to increase the amount of fuel supplied to the high pressure pump, said electromagnetic actuator including an armature which is connected to the other end of the rod, a transducer for providing a signal to said control system indicative of the setting of said throttle member, said transducer including a core which is caried by said rod intermediate the ends thereof, a first spring acting between said one end of the rod and a fixed part to oppose movement of the rod and throttle member by the actuator and a second spring acting to assist the action of the first spring said second spring acting on said rod adjacent the other end thereof.

4,877,006

AIR-FUEL RATIO CONTROL METHOD FOR INTERNAL COMBUSTION ENGINES

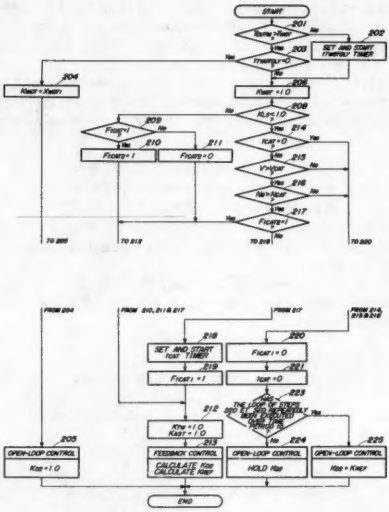
Kunio Noguchi; Yuzuru Koike, and Kazushige Toshimits, all of Wako, Japan, assignors to Honda Giken Kogyo K.K., Tokyo, Japan

Filed Sep. 1, 1988, Ser. No. 239,786

Claims priority, application Japan, Sep. 8, 1987, 62-224803

Int. Cl.[4] F02M *23/04*

U.S. Cl. 123—589 12 Claims



1. A method of controlling the air-fuel ratio of a mixture of fuel supplied to an internal combustion engine having an exhaust system and an exhaust-gas concentration sensor provided in said exhaust system, wherein feedback control is effected in response to an output from said exhaust-gas concentration sensor to bring the air-fuel ratio to a predetermined value when said engine is in a predetermined medium-load operating region, the method comprising the steps of:

(1) determining whether or not said engine is in a predetermined high-load operating region in which the feedback

control is interrupted for bringing the air-fuel ratio to a value smaller than said predetermined value;

(2) determining whether or not said engine is in a predetermined low-load operating region in which the feedback control is interrupted for bringing the air-fuel ratio to a value larger than said predetermined value; and

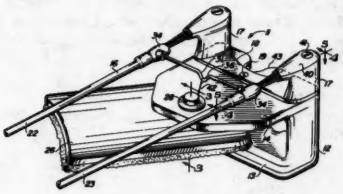
(3) effecting the feedback control even when said engine is in said predetermined low-load operating region, if said engine continually stayed over a first predetermined time period in said predetermined high-load operating region, and has shifted to said low-load operating region within a second predetermined time period after leaving said predetermined high-load operating region.

4,877,007

SLING BOW

Elwin N. Olson, 361 N. Washington St., P.O. Box 507, Wickenburg, Ariz. 85358

Filed Aug. 5, 1988, Ser. No. 228,501
Int. Cl.[4] F41B 7/00
U.S. Cl. 124—22 **10 Claims**



1. A sling bow comprising a handle, a pair of spaced sling posts connected to said handle, a flexible sling having its opposite ends connected respectively to said posts and having arms extending rearwardly from the posts to receive the nock of an arrow, the arms of said sling being made at least in part of elastic material so that they can be stretched and released to propel an arrow from the bow between the posts, and an arrow rest extending between the arms of said sling, said arrow rest being secured to and supported solely by flexible regions of said sling arms in spaced relation to and moveable with respect to said posts, the flexible arms of said sling providing the sole support for said arrow rest whereby the rest drops out of the path of the arrow when the sling is released to launch an arrow.

4,877,008

CROSSBOW TRIGGER MECHANISM

William C. Troubridge, R.R. No. 1, Breslau, Ontario, Canada (N0B 1M0)

Filed Nov. 28, 1984, Ser. No. 675,543
Claims priority, application Canada, Apr. 17, 1984, 452246
Int. Cl.[4] F41B 5/00
U.S. Cl. 124—25 **12 Claims**

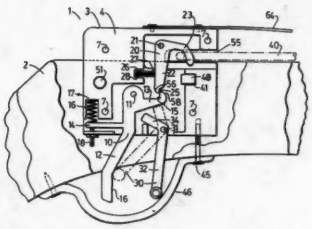
1. A crossbow trigger mechanism comprising:

(a) a mechanism-containing case adapted for installation in a crossbow stock;

(b) a forward-opening bowstring entry area in the upper portion of said case for receiving a bowstring;

(c) a one-piece trigger pivotally installed in a lower portion of said case, said trigger comprising a trigger arm extending downwardly from the trigger pivot point and out of the case and an integral sear arm extending forwardly from said trigger pivot point, said sear arm having a rearward-facing sear surface, such that said sear arm and its sear surface move downwardly when said trigger arm is pulled rearwardly, the length of said sear arm and said trigger arm being such that a mechanical advantage of in excess of 2.1 is achieved; and

(d) a catch pivotally installed in said case, its pivot point being slightly above the plane of said bowstring entry area and said bowstring, said catch comprising a bowstring-retaining hook portion extending forwardly form said catch pivot point for pivoting downwardly into said bowstring entry area for retaining a bowstring to arm the crossbow and upwardly away form said bowstring entry area for releasing said bowstring to project an arrow or other projectile, and a catch arm extending downwardly from said catch pivot point, said catch arm terminating in



a forward-facing sear surface, said sear surface adapted to be engaged by the sear surface of the sear arm of the trigger, such that rearward motion of the trigger arm disengages the sear arm sear surface from the catch arm sear surface;

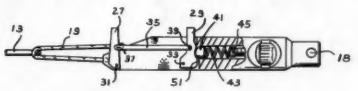
whereby, when a bowstring is retained by said bowstring-retaining hook poriton of said catch, and said trigger is pulled rearwardly, the sear surface disengages the catch arm sear surface, and the catch rotates about its pivot point by virtue of the force produced by bowstring tension, whereby the bowstring-retaining hook portion pivots upwardly away from said bowstring entry area, thereby releasing said bowstring to project an arrow or other projectile.

4,877,009

BOWSTRING DRAW AND RELEASE DEVICE

Richard R. Becker, 9910 Pecos St., Thornton, Colo. 80221

Filed May 9, 1988, Ser. No. 192,693
Int. Cl.[4] F41C 19/02
U.S. Cl. 124—35 A **11 Claims**



1. Device for drawing and automatically releasing an archery bowstring, comprising:

a. main body, adapted to be held by an archer;

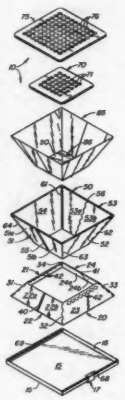
b. means for releasably retaining said bowstring including lever means pivotally mounted to said body and having an initial orientation in which it retains said bowstring and being pivotable to a bowstring releasing position, said lever means providing a radially extending protuberance;

c. adjustable, spring biased means mounted to said main body, and providing a depressible member which engages said protuberance to hold with an adjustable amount of force said lever means against rotation from its bowstring retaining position, and wherein said lever means is rotated to its release position when a predetermined amount of bowstring generated force creates torque in said lever means sufficient to cause said protuberance to depress said member.

4,877,010
OUTDOOR COOKING UNIT WITH DISPOSABLE COMPONENT

Paul W. Hait, Los Gatos, Calif., assignor to Pyromid, Inc., San Jose, Calif.

Division of Ser. No. 726,835, Apr. 24, 1985. This application Dec. 16, 1988, Ser. No. 285,660
Int. Cl.[4] F24C *1/16*
U.S. Cl. 126—9 A 9 Claims



1. A bendable, non-combustible, disposable member for cooking unit in which is disposed a fuel element, said member comprising:

(a) a closed bottom made of bendable, non-combustible material; and

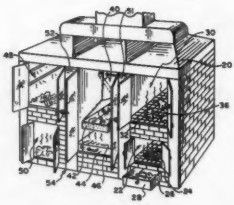
(b) a plurality of panels extending upwardly from said bottom forming a member having an inverted truncated pyramidal configuration with an open top, each of said panels being made of bendable, non-combustible material;

(c) said closed bottom and said panels being made of metallic paper.

4,877,011
BARBECUE PIT

George W. Willice, 7000 Hawthorne, Apt. 333, Hollywood, Calif. 90028

Filed Aug. 11, 1988, Ser. No. 231,200
Int. Cl.[4] A47J *37/07*
U.S. Cl. 126—25 R 15 Claims



1. A barbecue pit comprising:

a shell of masonry including a bottom wall, side walls, a back wall and a partial front wall, said shell further including two inner wall sections which divide the space within the shell into identical first, second and third compartments extending front to back within the shell;

said first compartment including a cooking chamber having a plurality of horizontal grates removably supported therein and a topless heat chamber including heat source means beneath said cooking chamber for supplying heat and smoke to said cooking chamber;

said second compartment including a sauce applying chamber having a container of sauce therein and means for applying said sauce to cooked meat placed within said chamber; and

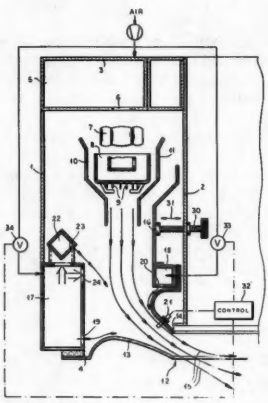
said third compartment including a sauce drying chamber including a plurality of horizontal grates removably supported therein and a plurality of ultraviolet light emitting means situated about said chamber for drying said sauce onto said meat to provide prepared meat, and a prepared meat storing chamber including heat source means for maintaining the prepared meat at a predetermined temperature; and

an exhaust hood forming a top wall of the shell and mounting means therein for exhausting gas and smoke from within the compartments upwardly into a chimney of the hood.

4,877,012
APPARATUS FOR PRODUCING HOT GAS FOR THE SHRINKAGE OF SYNTHETIC RESIN FOILS

Reiner Hannen, Goch-Pfalzdorf, and Norbert Vermeulen, Kleve-Warbeyen, both of Fed. Rep. of Germany, assignors to MSK-Verpackungs-Systeme Gesellschaft, Kleve, Fed. Rep. of Germany

Filed Mar. 14, 1988, Ser. No. 167,576
Claims priority, application Fed. Rep. of Germany, Mar. 18, 1987, 8704033
Int. Cl.[4] F24H *3/00*
U.S. Cl. 126—79 R 9 Claims



1. A device for generating hot air for the shrinkage of synthetic-resin foils, comprising:

a housing having a generally rectangular cross section with a pair of mutually parallel long sides and a pair of opposite short sides;

a burner in said housing proximal to one of said short sides and generating a combustion exhaust gas flow traveling generally toward the other of said short sides;

means on said housing defining an outlet nozzle proximal to said other of said short sides and trained out of said housing at an angle to said flow from said burner;

respective air-guide walls flanking said burner between said burner and said long sides of said housing, said air-guide walls extending beyond said burner in a direction of said flow to flank said flow beyond said burner, said air-guide walls being spaced from respective one of said long sides

of said housing to define respective air-flow compartments therewith and by distances which exceed spacings of said air-guide walls from the burner; and

means for supplying air to said housing in a region of said one of said short sides whereby said supplied air flows through said compartments and downstream of said air-guide walls forms streams flanking said exhaust gas flow which exits said outlet nozzle.

4,877,013

HOT BLAST STOVE INSTALLATION

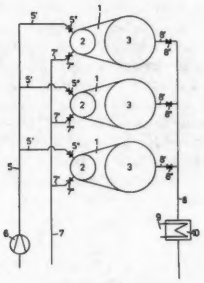
Friedrich Eschmann, Bischofsheim, and Christian Streuber, Wiesbaden-Auringen, both of Fed. Rep. of Germany, assignors to Didier-Werke AG, Wiesbaden, Fed. Rep. of Germany

Filed Dec. 11, 1987, Ser. No. 131,719

Claims priority, application Fed. Rep. of Germany, Jul. 31, 1987, 3725450

Int. Cl.[4] F24H *3/02*

U.S. Cl. 126—110 **12 Claims**



1. In a hot blast stove installation for heating cold blast to form hot blast and including a plurality of hot blast stoves each alternately operable during a heating phase and a blowing phase, and a cold blast main for supplying cold blast to respective said stoves during the blowing phases thereof, wherein said cold blast in said cold blast main has a relatively high temperature compared to ambient temperature, the improvement comprising:

means for reducing the temperature of said cold blast from said cold blast main prior to the supply thereof to said stoves.

4,877,014

TUBE ARRANGEMENT FOR HEAT EXCHANGER

John A. Beasley, Clarksville, Tenn., assignor to American Standard Inc., New York, N.Y.

Filed Jan. 19, 1988, Ser. No. 144,971

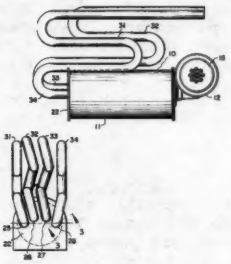
Int. Cl.[4] F24H *3/00*

U.S. Cl. 126—116 R **14 Claims**

1. A heat exchanger comprised of:

a generally horizontally disposed drum defining a substantially cylindrical combustion chamber with an end thereon having an upper portion and a lower portion, said end directly covering over and enclosing said combustion chamber, said end further having a plurality of apertures therethrough, with a majority of said apertures defined in the upper portion of said end;

a plurality of heat exchange members connected to said end for flow communication with said combustion chamber



through said apertures of said end so as to improve ignition and combustion characteristics of the heat exchanger.

4,877,015

MULTIPURPOSE SMOKELESS ROASTER

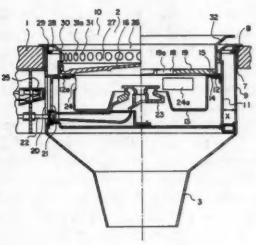
Takeshi Yamada, Nagaya, Japan, assignor to Shinpo Kabushiki Kaisha, Nagoya, Japan

Filed May 6, 1988, Ser. No. 191,275

The portion of the term of this patent subsequent to Jan. 10, 2006, has been disclaimed.

Int. Cl.[4] F24C *15/20*

U.S. Cl. 126—299 R **11 Claims**



1. A multipurpose smokeless roaster comprising:

(a) an upper support wall extending horizontally and having an opening contained therein;

(b) a roasting unit comprising a cylindrical outer box having an opened upper end, said outer box being mounted and supported within said opening in said upper support wall by end edges thereon, a cylindrical inner box having an opened upper end contained and supported within said outer box and defining a suction passage therebetween, said inner box having contained therein a burner and an annular surface on which a metal grill or a pot stand may be mounted, said annular surface being defined at an inner peripheral wall surface of said opened upper end of said inner box, and an exhausting unit provided at a lower part of said roasting unit, said exhausting unit being in fluid communication with said suction passage and diminishing in outer and inner diameter as it extends away from said lower part of said roasting unit;

(c) a movable draft pipe vertically, slidably fitted on the outer circumference of said exhausting unit, said movable draft pipe being capable of introducing outside air into gas exhausted from said roasting unit and regulating a suction force applied to said roasting unit, said movable draft pipe additionally having an inner diameter approximately equal to the maximum outer diameter of said exhausting unit;

(d) a connector box provided at a lower part of said movable draft pipe and connected therewith at a side surface thereof through a fixed pipe, said connector box containing a static pressure equalizer comprising a slit of triangular shape, said slit gradually widening from a lower portion to an upper portion thereof and separating an inner exhaust passage from an outer exhaust passage, said static pressure equalizer equalizing said suction force applied to said roasting unit with a static pressure; and

(e) a duct unit provided at the side of said connector box and attached thereto, said duct unit leading to a source of said suction force.

4,877,016

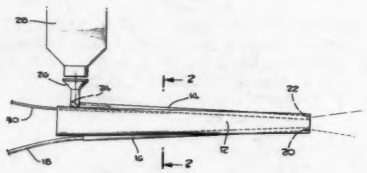
VIDEO ENDOSCOPIC MICROSCOPE

Edward A. Kantor, 9872 Whitwell Dr., Beverly Hills, Calif. 90210; George Berci, 555 Levering Ave., #309, Los Angeles, Calif. 90024, and Karl Storz, AM Schildrein 39, 7200 Tuttlingen, Fed. Rep. of Germany

Filed Jul. 29, 1988, Ser. No. 226,417

Int. Cl.[4] A61B *1/04, 1/06*

U.S. Cl. 128—6 **20 Claims**



1. An improved endoscope including an extended side wall having distal and proximal ends comprising in combination:

a first tube having distal and proximal ends extending the length of the endoscope, said distal end being wholly within the endoscope and adjacent the side wall at the distal end thereof;

optical system means within said first tube including a lens at said distal end for magnifying objects of interest, said optical system means being capable of viewing an area up to 25 mm with a depth of field in excess of 10 mm; and

viewing means coupled to said first tube and extending laterally from the endoscope at the proximal end thereof to provide a viewing port remote from the interior of the endoscope;

whereby a magnified image of an area of interest accessible to the distal end of the endoscope can be viewed from a location that is laterally displaced from the side wall of the endoscope.

4,877,017

APPARATUS FOR NON-CONTACTING DISINTEGRATION OF CONCRETIONS

Alfred Hahn, and Georg Vogel, both of Erlangen, Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

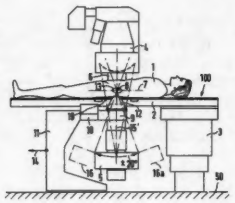
Continuation of Ser. No. 860,590, May 7, 1986, abandoned. This application Jan. 27, 1989, Ser. No. 302,144

Claims priority, application Fed. Rep. of Germany, May 28, 1985, 3519127

Int. Cl.[4] A61B *17/22*

U.S. Cl. 128—24 A **4 Claims**

1. In an apparatus for a non-contacting disintegration of concretion situated in a body of a life form, said apparatus including a shock wave generator having energy waves being focused at a focal point on an isocenter positioned in a target region of the body, said generator having coupling means for transferring the energy from the generator to the body, said coupling means including a container having at least one flexible wall and being filled with a coupling agent, the improvements comprising a patient bed having a surface extending in a longitudinal direction for receiving a body, said bed having an aperture through said surface in an area below said isocenter, a carriage supporting the shock wave generator for pivotal movement around a longitudinal axis spaced above the surface of the bed and extending parallel to the longitudinal direction with the shock wave generator being below the bed with the coupling means located between the generator and bed and the focal point being on said longitudinal axis, said carriage being moveable along the longitudinal direction from a working position with the coupling means extending through the aperture and the flexible wall contacting said body to a removed position with the focal point being moved along the longitudinal axis, an X-ray unit with an X-ray emitter and radiator receiver, and means for separately adjusting the position of the X-ray unit while the shock wave generator is in the working position comprising a C-shaped carrier mounting the receiver and emitter on opposite sides of the bed at the working position and having a pivot point lying on said longitudinal axis so that while the shock wave generator is treating a patient, the X-ray unit can be adjusted and operated without imaging the generator on an X-ray image.



4,877,018

DEVICE FOR DEODORIZING AND DRYING PORTION BETWEEN TOES

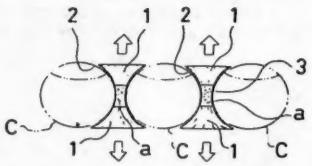
Takashi Ikebe, Sakai, and Takigawa: Masuhiko, Osaka, both of Japan, assignors to Masuhiko Takigawa, Osaka, Japan

Filed Sep. 12, 1988, Ser. No. 243,042

Claims priority, application Japan, Sep. 21, 1987, 62-144783[U]

Int. Cl.[4] A61F *5/00*

U.S. Cl. 128—81 R **1 Claim**



1. A device for deodorizing and drying an area between toes, comprising:

two rod-shaped flexible fibrous elements, each element comprising a large number of fibers disposed parallel to the longitudinal axis of said element,

an air- and water-permeable flexible shell member enclosing the rod-shaped surface of said flexible fibrous elements, the flexible fibrous elements being disposed in spaced apart end to end relation in the longitudinal direction for defining a cavity between the flexible fibrous elements, and

particulate substances having a hygroscopic function housed

in said cavity in a quantity corresponding to a part of a volume of said cavity,

wherein the transverse dimension of said device is such that said device is capable of being inserted between toes.

4,877,019

INTRAMEDULLARY NAIL AND APPARATUS FOR ITS INSERTION

Pierre Vives, Via Clemente Prudenzio, 14/16, 20138 Milan, Italy

Filed Nov. 16, 1987, Ser. No. 120,823

Claims priority, application Italy, Dec. 2, 1986, 22543 A/86

Int. Cl.[4] A61B *17/58*

U.S. Cl. 128—92 YK **1 Claim**

1. An intramedullary nail, comprising an elongated tubular body of hexagonal cross section having a distal end and a proximal end, with a frustoconical taper at said distal end, said elongated tubular body further having a side wall including at least a hole therein adjacent said distal end and at least a slot adjacent said proximal end, wherein said elongated tubular body has a slot extending in a longitudinal direction of said tubular body and formed for a given length along a longitudinal corner defined by two adjoining sides of said hexagonal cross-section, said longitudinal slot being so designed and arranged as to increase flexural elasticity of said elongated tubular body in said longitudinal direction.

4,877,020

APPARATUS FOR BONE GRAFT

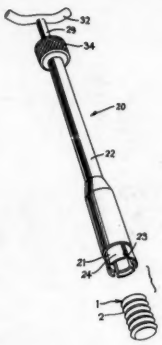
Jose M. O. Vich, Av. de Montero Rios 24, 3°, Vigo (Pontevedra), Spain

Division of Ser. No. 707,305, Mar. 1, 1985. This application May 24, 1988, Ser. No. 198,081

Claims priority, application Spain, Nov. 30, 1984, 283078

Int. Cl.[4] A61F *5/04*; A61B *17/00*; B25B *23/00*

U.S. Cl. 128—92 V **1 Claim**



1. An instrument for holding and permitting insertion of a substantially cylindrical bone implant which is externally threaded into a substantially cylindrical bed, said instrument comprising:

an elongated rod shaped handle defining opposite ends and having a substantially central bore extending coaxially therethrough, one end of said handle defining an opening terminating in a substantially frusto-conical bore which divergently opens outwardly through said one end of the handle;

a substantially cylindrical sleevelike implant holding head engageable with said one end of said handle, said holding head being formed of a sleeve defining a bore for accommodating one end of the implant, said sleeve having axial slits formed in one end thereof so that the sleeve defines a resiliently deformable collet structure for gripping the implant, said sleeve having an external frusto-conical surface which projects into and wedgingly engages the frusto-conical surface on said handle;

an elongated control rod projecting coaxially through the opening of said handle and being fixedly secured to said holding head, said control rod projecting outwardly through the other end of said handle and being provided with an enlarged gripping portion thereon; and

said control rod and said handle each having a coaxially threaded portion to be threadably coupled together so that relative rotation therebetween results in a corresponding axial displacement of the holding head.

4,877,021

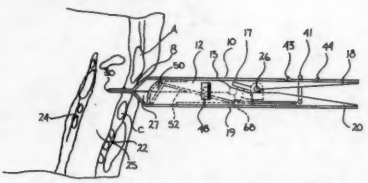
EMERGENCY AIRWAY SURGICAL DEVICE

Gary Higer, 14000 Peach Grove, Sherman Oaks, Calif. 91423, and Michael L. Mintz, 141 Kush La., Corpus Christi, Tex. 78404

Continuation-in-part of Ser. No. 733,961, May 14, 1985, abandoned. This application Apr. 16, 1987, Ser. No. 39,620

Int. Cl.[4] A61M *11/00*

U.S. Cl. 128—200.76 **16 Claims**



1. A laryngeal-tracheal instrument for permitting pulmonary ventilation of a subject comprising:

(a) a cutting means for incising a trachea of the subject comprising:

(i) a housing defining a cavity, said housing divided horizontally to form a pair of horizontally aligned superior and inferior arms, and including pivot means disposed between the arms for pivotally interconnecting said arms to enable scissor-like movement; and

(ii) a sharpened flattened blade horizontally disposed of the posterior end of each of said arms, said blades forming a unitary horizontal cutting edge when said arms are in a closed relationship; and

cannula means disposed within said cavity formed by said arms and removable at the posterior end thereof when said arms are in an open relationship, said cannula means comprising:

(i) a housing having a blunt posterior surface and being of adapted to engage the posterior portion of the trachea of the subject, an inferior surface having an opening in the posterior portion thereof and a superior surface having an opening in the anterior portion thereof, said housing being sized such that when the posterior surface engages the posterior portion of the trachea, the opening in the superior surface is external of the subject; and

(ii) centering means adjustably disposed within said housing, said centering means comprising a flattened member means and inferiorly angled flange means at the posterior thereof adapted to engage the anterior portion

of the trachea, said flattened member means being adapted to move from a first position in which said flange means is disposed substantially within said housing for easy insertion into the trachea to a second position where said flange means extends through said opening in the inferior surface of the housing and engages the anterior portion of the trachea when said posterior surface of the housing engages the posterior portion of the trachea thereby securing said cannula means in position.

4,877,022

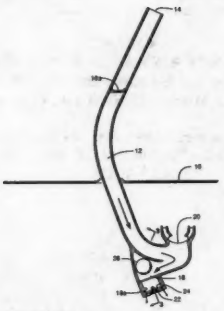
SKIN DIVING SNORKEL

Tony Christianson, 277 Grulla Ct., Norco, Calif. 91760

Filed Dec. 30, 1988, Ser. No. 292,225

Int. Cl.[4] B63C *11/16*

U.S. Cl. 128—201.11 **15 Claims**



1. A snorkel device comprising:

a conduit having first and second ends thereof;

said first end of said conduit being open whereby it is unobstructed and freely admits ambient fluid into said conduit;

mouthpiece means joined to said second end of said conduit and communicating fluid flow with said conduit;

a chamber having a first opening into said conduit, and an ambient opening;

said first opening of said chamber communicating fluid flow with said conduit;

purge valve means disposed at said ambient opening of said chamber, said purge valve means arranged to selectively provide unidirectional flow from said chamber to ambient; and

a mobile member situated in said chamber, said mobile member substantially blocking fluid flow to said purge valve means when water is not flooding said chamber.

4,877,023

APPARATUS FOR ARTIFICIAL VENTILATION FOR ASSISTING THE VOLUMETRIC BREATHING OF A PATIENT

Daniel Zalkin, Rambouillet, France, assignor to B.O.C.S.A., Maurepas, France

Continuation-in-part of Ser. No. 799,849, Nov. 14, 1985. This application Feb. 25, 1988, Ser. No. 160,257

Claims priority, application France, Nov. 20, 1984, 84 17653

Int. Cl.[4] A61M *16/00*

U.S. Cl. 128—204.21 **17 Claims**

1. Apparatus for assisting the spontaneous breathing of a patient, comprising:

a single source of breathable gas under pressure;

an inspiration tube and an exhalation tube, both of said tubes being connected to a patient;

a demand valve connected between said source and said inspiration tube;

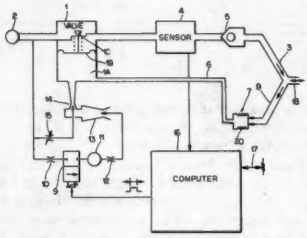
flow rate control generator means coupled to said source;

computer means, and sensor means connected to said computer means for detecting the flow rate of gas delivered to the patient, and wherein said computer means, in real time, calculates the volume of gas delivered to the patient and controls said generator means;

a flow rate sensor connected to said demand valve and to said inspiration tube;

a Venturi tube having an inlet communicating with said source and an outlet communicating with said reference chamber;

a bellows communicating with the interior said said reference chamber and with said exhalation tube;



means permitting breathable gas from said source to enter into said reference chamber via said Venturi tube for creating a pressure in said reference chamber which communicates simultaneously with said bellows as a PEEP pressure and with said demand valve to control the flow rate of breathable gas from said source, through said demand valve toward said inspiration tube; and

said flow rate control generator means coupled to said source, also being coupled to said computer means and to said Venturi tube for increasing the pressure in the reference chamber in response to a demand from said flow rate sensor and thereby the flow rate of breathable gas from said source to said inspiration tube, said flow rate control generator means having an inlet connected to said single source and an outlet communicating with the inlet of said Venturi tube.

4,877,024

AIRWAY

Patrick K. Sheehy, Reading, England, assignor to P K Airway Limited, Berkshire, England

PCT No. PCT/GB85/00023, § 371 Date Sep. 18, 1985, § 102(e) Date Sep. 18, 1985, PCT Pub. No. WO85/03232, PCT Pub. Date Aug. 1, 1985

Continuation of Ser. No. 930,054, Nov. 12, 1986, abandoned, which is a continuation of Ser. No. 778,181, Sep. 18, 1985, abandoned. This PCT application Jan. 18, 1985, Ser. No. 201,376

Claims priority, application United Kingdom, Jan. 18, 1984, 8401324; PCT Int'l Appl., Jan. 18, 1985, PCT/GB85/00023

Int. Cl.[4] A61M *16/00*

U.S. Cl. 128—207.14 **6 Claims**

1. An airway for insertion into the mouth of a subject, and for defining a passage for air or anaesthetic gas into the trachea of the subject, comprising:

(a) first and second tubes each having a forward end and a rear end;

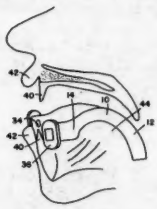
(b) the first and second tubes being joined at their rear ends to define an intersection, said first and second tubes also being joined at said intersection to a third tube, and said first and second tubes being inclined to one another and to the third tube, said first and second tubes being otherwise

spaced apart from each other, the spacing between said tubes increasing from said intersection to said forward ends, said first, second and third tubes thus defining a structure in a configuration which is Y-shaped in plan view;

(c) the third tube being shaped to extend into the oropharyngeal space of the subject;

(d) each of the first and second tubes having a bore which extends from its forward end to its rear end, and the third tube having a bore which is connected to the bores in the first and second tubes, the bores in the first, second and third tubes forming a passage for air or anaesthetic gas;

(e) each of the first and second tubes having a straight bracing portion extending rearward from its forward end and a rear portion connecting the bracing portion to the third tube, said spacing between said first and second tubes being such that said bracing portions and their associated bores are positioned for being gripped in use between upper and lower molar teeth of the subject on respective opposite sides of the mouth of the subject so that said forward ends of said first and second tubes face outward from the mouth, thereby to hold the mouth open to prevent engagement between upper and lower front teeth of said subject and wherein said airway is free of connections extending between said first and second tubes forward of said intersection to prevent engagement between said airway and said upper and lower front teeth.

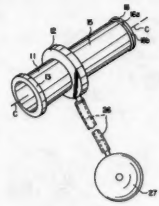


4,877,025

TRACHEOSTOMY TUBE VALVE APPARATUS

Donald W. Hanson, 8516 Great Plains Blvd., Chanhassen, Minn. 55317

Filed Oct. 6, 1988, Ser. No. 254,258
Int. Cl.[4] A61M *16/00*
U.S. Cl. 128—207.16 **16 Claims**



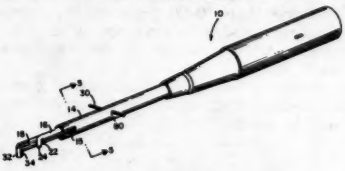
1. Tracheostomy tube valve apparatus insertable into tracheostomy stoma in the neck of a patient to extend through the tracheal wall into the trachea, comprising a tube valve assembly that includes a tube part having an inner peripheral wall, a distal annular end and a proximal annular end, a proximal annular flange adapted for abutment against the skin of the throat and being joined to the tube part proximal end, a distal annular flange insertable through the stoma and adapted for forming a close fit with the tissue surrounding the stoma being joined to the tube part distal end in axial spaced relation to the proximal flange, each flange being of an outer diameter substantially larger than the outer diameter of the tube part, and inflatable first means joined to at least one of the distal flange, the proximal flange and the tube part, and extending within the tube part between the flanges, for selectively being inflated to block fluid flow through the tube part and second means connected to the assembly for selectively inflating the inflatable means and deflating the inflatable means when the inflatable means is inflated, said inflatable first means includes means acting in cooperation with the inner peripheral wall for forming an inflatable chamber that when inflated blocks fluid flow through the tube part, and that the second means includes a fluid passage that opens through the proximal flange to the chamber to permit fluid flow to and from the chamber.

4,877,026

SURGICAL APPARATUS

Hughes de Laforcade, Manchester, Mass., assignor to Microline Inc., Danvers, Mass.

Filed Jul. 22, 1988, Ser. No. 223,432
Int. Cl.[4] A61B *17/32*
U.S. Cl. 128—305 **24 Claims**



1. A surgical apparatus for insertion into the eye for surgical procedures, said apparatus comprising:

an elongated rigid tubular housing of circular cross section having an inner tubular wall supporting therein a first and a second elongated shaft member;

said first and said second elongated shaft members each having juxtaposed inner surfaces slidable relative to each other for a predetermined stroke distance, said first and said second shaft members further having outer surfaces terminating in corners, said corners abutting said inner tubular wall, said shaft members being held in a spacial relationship relative to each other and said inner tubular wall by said corners, whereby said shaft members occupy only a portion of the space in said inner tubular housing, thus leaving a freeboard space between said outer surfaces and the inner tubular wall;

said first shaft member having at one end, a driven end, and at the other end a first operable means disposed thereon;

said second shaft member being fixedly disposed in said tubular housing and having a second operable means disposed thereon, said second operable means being cooperatable with said first operable means to perform a surgical procedure; and

means for restraining the motion of said first shaft member on a plane parallel to the axis of said tubular housing and for limiting the distance of a stroke of said first shaft member relative to said second shaft member, whereby to limit the movement of said first operable means relative to said second operable means.

4,877,027

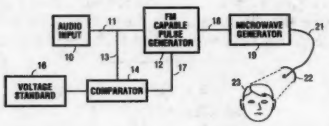
HEARING SYSTEM

Wayne B. Brunkan, P.O. Box 2411, Goleta, Calif. 93118

Filed Jun. 6, 1988, Ser. No. 202,679
Int. Cl.[4] A61N *5/00*
U.S. Cl. 128—420.5 **8 Claims**

1. Apparatus for creating human hearing comprising:

(a) an audio source for creating electrical audio waves having positive peaks;
(b) a frequency modulator generator connected to the audio source to create frequency modulated bursts;
(c) a source of constant voltage to create a voltage standard that is in the range of 25% to 85% of the peak voltage of the audio waves;
(d) a comparator connected to the voltage source and the audio source to compare the instantaneous voltage of the waves from the audio source with the voltage standard;



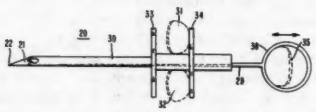
(e) a connection of the comparator to the frequency modulator generator to activate the frequency modulator generator when the instantaneous voltage of the audio wave exceeds the standard voltage;
(f) a microwave generator creating microwaves in the range of 100 megahertz to 10,000 megahertz and connected to the frequency modulator generator, generating microwaves only when pulsed by the frequency modulator generator; and
(g) an antenna connected to the microwave generator to radiate the head of a human being to produce the sounds of the audio source.

4,877,028

APPARATUS FOR EFFECTING OCCLUSION OF THE VAS DEFERENS

Jeffrey Sandhaus, Palisades, N.Y., assignor to Vastech Medical Products Inc., New Brunswick, N.J.

Continuation of Ser. No. 884,417, Jul. 11, 1986, abandoned. This application Jul. 25, 1988, Ser. No. 223,682
Int. Cl.[4] A61B *17/12*
U.S. Cl. 128—326 **6 Claims**



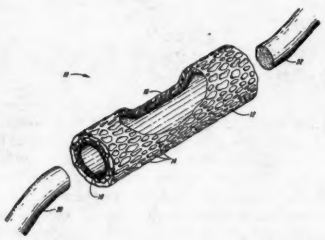
1. Apparatus for implanting locking clips to effect percutaneous occlusion of a target vessel comprising
a. tissue penetration means including a forward face and a rearward face, said forward face including a barbshaped end portion for penetrating tissue upon forward movement of said tissue penetration means, and said rearward face defining at least a portion of a target vessel chamber, and including a rearwardly facing barb-shaped portion capable of penetrating tissue upon rearward movement of said tissue penetration means
b. clip retaining means for retaining said locking clip in a predetermined location distal to said rearward face of said tissue penetration means,
c. camming means disposed within said target vessel chamber for closing said locking clip, and
d. slide means for obtaining relative slidable movement between said tissue penetration means and said clip retaining means, whereby said tissue penetration means can be used for penetrating tissue substantially entirely around said target vessel, and said tissue penetration means and said clip retaining means can be slidably moved between a first relative position in which said target vessel chamber and said clip retaining means are longitudinally separated from each other, a second relative position in which said target vessel chamber and said clip retaining means are substantially superimposed with each other such that said target vessel located within said target vessel chamber is substantially surrounded, at least in part within said locking clip, and a third relative position in which said locking clip is caused to close upon said target vessel by movement against said camming means so as to effect said occlusion thereof.

4,877,029

SEMIPERMEABLE NERVE GUIDANCE CHANNELS

Robert F. Valentini; Patrick Aebischer, and Pierre M. Galletti, all of Providence, R.I., assignors to Brown University Research Foundation, Providence, R.I.

Filed Mar. 30, 1987, Ser. No. 32,489
Int. Cl.[4] A61B *17/04*
U.S. Cl. 128—334 R **7 Claims**



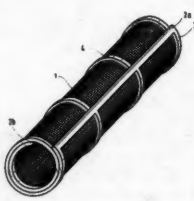
1. A medical device for use in regenerating a severed nerve, the device comprising a tubular semipermeable membrane having openings adapted to receive the ends of a severed nerve, at least one longitudinally-oriented trabecula within the membrane to provide a passageway for capillary ingrowth, a porous outer membrane surface which permits capillary ingrowth into said trabecula, and a semipermeable inner membrane surface, whereby the tubular membrane device provides a protective guidance channel for the regeneration of said nerve therethrough.

4,877,030

DEVICE FOR THE WIDENING OF BLOOD VESSELS

Andreas Beck, W. Hausensteinstrasse 10a, 7746 Hornberg, and Norbert Nanko, 7800 Freiburg, both of Fed. Rep. of Germany

Filed May 31, 1988, Ser. No. 200,380
Claims priority, application Fed. Rep. of Germany, Feb. 2, 1988, 3803003
Int. Cl.[4] A61M *29/02*
U.S. Cl. 128—343 **7 Claims**



1. A device having a non-widened state for insertion within a blood vessel and selectively expandable therewithin by means of a balloon catheter or the like, the device comprising:

a generally rectangular panel of a relatively flexible woven material and having end edges and side edges;

the panel being wound around in a generally cylindrical shape with the end edges overlapping each other in the non-widened state, and with internal area sufficient to accommodate a balloon catheter or the like;

reinforcing means defining an end border and reinforcing each end edge of the woven material, each such reinforcing end border having a surface coplanar with the panel and parallel to the corresponding end edge of the panel;

reinforcing means defining a side border along and reinforcing each side edge of the panel; and

the end borders being operative to move into manual abutment when the panel is unwound by inflation of a balloon catheter or the like to unwind and widen the cylindrical shape to an extent that the end edges no longer overlap,

so that the surfaces of the end borders abut one another and maintain the widened cylindrical shape of the device within a blood vessel.

4,877,031

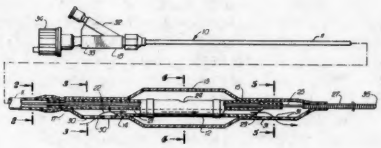
STEERABLE PERFUSION DILATATION CATHETER

Jean M. Conway, Mountain View, and Peter R. McInnes, Sunnyvale, both of Calif., assignors to Advanced Cardiovascular Systems, Inc., Mountain View, Calif.

Filed Jul. 22, 1988, Ser. No. 223,088

Int. Cl.[4] A61M *25/00*

U.S. Cl. 128—344 **10 Claims**



1. A steerable perfusion dilatation catheter comprising:

(a) an elongated tubular member having an inner lumen extending along the interior thereof;

(b) a tubular perfusion body secured by the proximal end thereof to the distal extremity of the elongated tubular member, said perfusion body having a first, relatively small diameter lumen extending longitudinally therethrough in fluid communication with the inner lumen of the tubular member and having an inflation/deflation port open to the exterior of the perfusion body and a second, relatively large diameter lumen extending longitudinally therethrough with at least one inlet port on the proximal end thereof and at least one discharge port on the distal portion thereof adapted to facilitate the passage of blood therethrough;

(c) an inflatable dilatation balloon member which is sealably secured by proximal and distal extremities thereof about the perfusion body with the inflation/deflation port of the perfusion body within the interior of the balloon member connecting in fluid communication the first, relatively small diameter lumen within the perfusion body with the interior of the balloon member to facilitate the inflation and deflation thereof; and

(d) a guiding member extending through and fixed within the small diameter lumen of the perfusion body and having a distal portion extending out the distal end of the balloon, whereby the catheter can be advanced through a patient,s vascular system and a stenosis therein, the balloon thereof inflated to dilate the stenosis and blood is perfused through the balloon distal to the catheter.

4,877,032

SENSOR ARRANGEMENT FOR THE CONTROL OF IMPLANTABLE DEVICES

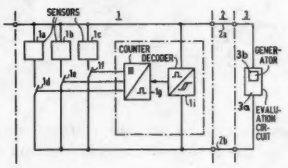
Roland Heinze, Munich, and Hans-Dieter Liess, Muensing, both of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin & Munich, Fed. Rep. of Germany and Siemens Aktiengesellschaft, Munich, Fed. Rep. of Germany

Continuation of Ser. No. 51,856, May 20, 1987, abandoned. This application Apr. 6, 1989, Ser. No. 333,805

Claims priority, application Fed. Rep. of Germany, Jun. 16, 1986, 3620277

Int. Cl.[4] A61N *1/00*

U.S. Cl. 128—419 PG **18 Claims**



1. An apparatus for medically treating a patient comprising:

an implantable device which supplies a medical treatment to said patient, said device having at least one variable function;

a catheter connected to said device and also implantable in said patient, said catheter having a plurality of leads therein;

a plurality of sensors which respectively generate measured signals corresponding to different body parameters of said patient contained within said catheter;

control means in said catheter for successively respectively connecting said sensors across only two leads of said plurality of leads and thereby activating said sensors chronologically offset;

an evaluation means disposed in said implantable device remote from said sensors and connected to said sensors by said catheter for generating a signal for use in varying said variable function from said measured signals; and

means for transmitting said respective measured signals from each activated sensor chronologically offset to said evaluation means via no more than said two leads.

4,877,033

DISPOSABLE NEEDLE GUIDE AND EXAMINATION SHEATH FOR TRANSVAGINAL ULTRASOUND PROCEDURES

H. Michael Seitz, Jr., 214 Airdale Road, Rosemont, Pa. 19010

Filed May 4, 1988, Ser. No. 190,059

Int. Cl.[4] A61B *10/00*

U.S. Cl. 128—660.05 **17 Claims**

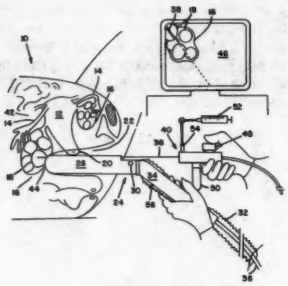
1. A disposable combination needle guide and operative sheath adapted for use in surgical procedures on a transvaginal ultrasound probe comprising:

a rigid hollow body having one closed and one open end, said open end sized to receive the insertion end of said probe;

a sealed window in said body, said window being positioned at said closed end and permitting passage of ultrasonic waves therethrough without undue distortion;

an integral elongated needle or instrument passageway extending along a portion of said hollow body;

a flexible sleeve sealed to said open end and sized to receive said probe; and



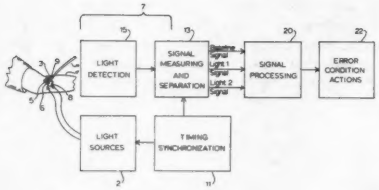
locking means associated with said hollow body to fix said hollow body in position with respect to said ultrasound probe.

4,877,034

METHOD AND DEVICE FOR DETECTION OF TISSUE INFILTRATION

Judy M. Atkins; Benjamin J. Comfort, both of Hillsborough, and Ralph A. Liebelt, Durham, all of N.C., assignors to Smith & Nephew, Inc., Itasca, Ill.

Filed Jun. 18, 1987, Ser. No. 65,015
Int. Cl.[4] A61B *6/00*
U.S. Cl. 128—664 **10 Claims**



1. A device for the detection of infiltration of intravenously delivered fluids into tissue surrounding an intravenous insertion site comprising radiation monitoring means for measuring changes in the relationship between a plurality of wavelengths of electromagnetic radiation traveling in said tissue upon the occurrence of tissue infiltration by said fluids in order to prevent tissue damage, said radiation monitoring means including:

(a) a patch placed over said intravenous insertion site;

(b) a plurality of electromagnetic radiation sources incorporated in said patch, said radiation sources directing electromagnetic radiation at said tissue;

(c) radiation detection means additionally incorporated in said patch, said radiation detection means being capable of detecting said wavelengths of electromagnetic radiation and converting them to electrical signals; and

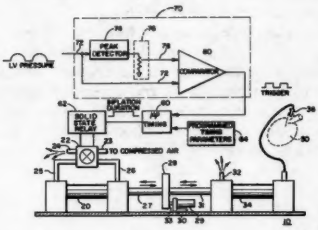
(d) timing synchronization means electrically connected to said electromagnetic radiation sources, said timing synchronization means being capable of regulating the activation of said electromagnetic radiation sources.

4,877,035

MEASUREMENT OF THE END-SYSTOLIC PRESSURE-VOLUME RELATION USING INTRAAORTIC BALLOON OCCLUSION

Daniel Bogen, Philadelphia, Pa., and Krishanu Gupta, Cherry Hill, N.J., assignors to Trustees of the University of Pennsylvania, Philadelphia, Pa.

Filed Oct. 12, 1988, Ser. No. 257,105
Int. Cl.[4] A61B *5/02*
U.S. Cl. 128—673 **11 Claims**



1. A method of determining an index of the global ventricular contractility of a biological pump, comprising the steps of:

(a) acquiring data representative of ventricular pressure and data representative of ventricular volume of the biological pump during at least one beat of the biological pump;

(b) transiently altering the hemodynamic load of the biological pump;

(c) acquiring data representative of ventricular pressure and data representative of ventricular volume of the biological pump during at least one beat of the biological pump while the biological pump is in the altered hemodynamic state;

(d) identifying the pressure and volume data value associated with the end-systolic point of the beats the biological pump of steps (a) and (c); and (e) relating the data identified in step (d) to the end-systolic elastance of the biological pump.

4,877,036

SWAB TRANSPORT SYSTEM

Elmer F. Saint-Amand, 15740 Mill Meadow, Canyon Country, Calif. 91351

Division of Ser. No. 107,408, Oct. 13, 1987, Pat. No. 4,813,432.
This application Nov. 28, 1988, Ser. No. 276,639
Int. Cl.[4] A61B *10/00*
U.S. Cl. 128—749 **4 Claims**

1. A swab transport apparatus for containing and transporting a swab of the character having an elongated stem and a bibulous swab material carried proximate one end of the stem, said apparatus comprising:

(a) an elongated longitudinally extending plastic body having first and second ends, said body being open at said first end and including:

(i) a first elongated chamber having resiliently deformable side walls communicating with said first open end for receiving at least a portion of the swab;

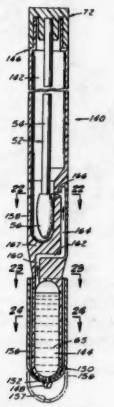
(ii) a second chamber having resiliently, deformable side walls for containing fluid therewithin, said second fluid medium chamber being longitudinally spaced from said first chamber;

(iii) a third chamber having resiliently deformably side walls disposed intermediate said first and second chambers, said third chamber being in communication with said first chamber via an axially extending fluid passageway and said third chamber being in communication with said second chamber via a circuitous fluid flow path; and

(iv) a tubular segment formed proximate said second end of said body having a fluid passageway extending there-

through for interconnecting said second chamber with atmosphere;

(b) a removable first cover means for sealably closing said open first end of said tube, said first cover means including an



axially extending bore for closely receiving a portion of the elongated stem of the swab; and

(c) a removable second cover means carried by said tubular segment for surrounding said second chamber to prevent inadvertent deformation of the side walls thereof.

4,877,037

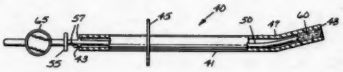
TISSUE OR MUCUS SAMPLING DEVICE

Su-sen Ko, and Dan L. Fanselow, both of White Bear Township, Ramsey County, Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Continuation-in-part of Ser. No. 69,766, Jul. 6, 1987, abandoned, which is a continuation-in-part of Ser. No. 796,967, Nov. 12, 1985, abandoned. This application Oct. 6, 1988, Ser. No. 254,358

Int. Cl.[4] A61B *10/00*

U.S. Cl. 128—756 **14 Claims**



1. A tissue or mucus sampling device for obtaining a tissue or mucus sample from the cervical os or the vaginal fornix comprising at one-piece elongate, cylindrical outer protective sleeve terminating in a tip, positionable guard means on said protective sleeve for limiting the insertion depth of said device into the vaginal cavity, an elongate, cylindrical insertion tube having a first end and a second end telescopically fitting within said protective sleeve, surmountable stop means on said insertion tube for temporarily inhibiting said first end of said insertion tube from protruding through said protective sleeve, stop means on said insertion tube for permanently limiting the extent of protrusion of said tube beyond said sleeve, a tissue or mucus sampling member on said first end of said insertion tube and a handle member affixed to said second end of said insertion tube for manipulating said tube.

4,877,038

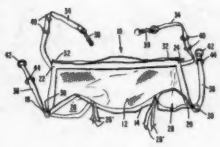
HAND AND ARM RESTRAINT

Eberhard Fricke, and Marie S. Fricke, both of 7021 Kittyhawk Ave., Los Angeles, Calif. 90045

Filed Sep. 2, 1988, Ser. No. 239,927

Int. Cl.[4] A61F *13/00*

U.S. Cl. 128—869 **10 Claims**



1. A hand and arm restraint comprising a pouch member of a size large enough to receive the hands, lower arms, and at least a portion of the upper arms of a patient, said pouch member having a top edge, a bottom edge, and four corners, two corners being associated with said top edge and two corners being associated with said bottom edge, with two arm-receiving openings disposed along said top edge and separated by a distance similar to that of said arms of said patient, each arm-receiving opening provided with a pair of ties for adjusting the extent of said opening so as to prevent removal of an arm therefrom, and zipper means disposed along said bottom edge for gaining access by a care-taker to the interior of said pouch member.

4,877,039

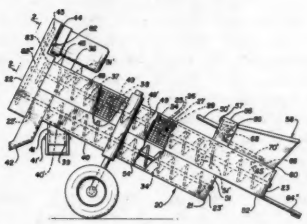
GRAIN CLEANER

Dean S. Somerville, P.O. Box 215, McHenry, N. Dak. 58464, and Curtis T. Stokkeland, Route #1, Box 21, Cooperstown, N. Dak. 58425

Filed Aug. 26, 1988, Ser. No. 237,510

Int. Cl.[4] A01F *12/30*

U.S. Cl. 460—97 **3 Claims**



1. A grain cleaning device comprising a frame, a plurality of augers mounted to said frame beside one another in parallel relation, cylindrical screens surrounding the augers with the ends of the augers being open and free of the screens to allow access to the ends of the augers, a motor means to rotate the augers simultaneously, a box-like structure at the rearward ends of the augers to guide grain into the open rearward ends of the augers, said screens having mesh openings of a size slightly smaller than the size of the grain being cleaned, whereby grain may be dumped into the box-like structure at the rearward ends of the augers and will be augered simultaneously by all the augers along the augers and retained within the screens to the forward ends of the augers and out the

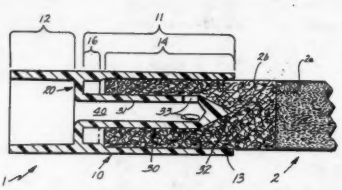
forward ends of the screens and augers, while foreign and other non-grain particles of a size smaller than the size of the mesh openings will be allowed to pass through the mesh openings in the screens and gravitate downward from the screened augers, to thereby clean the grain, a bin beneath the screened augers to collect said particles, a chute at the forward end of the augers whereby the grain may travel down the chute at the forward end of the augers to the exterior of the frame.

4,877,040

CIGARETTE HOLDER WITH FILTER MODIFIER, AND RELATED METHOD

Donald Jansma, Grand Rapids, Mich., and Howard W. Stemm, Lenexa, Kans., assignors to Bissell Health Care Corporation, Grand Rapids, Mich.

Continuation-in-part of Ser. No. 42,326, Apr. 24, 1987, abandoned. This application Apr. 8, 1988, Ser. No. 179,287
Int. Cl.[4] A24D *3/04*
U.S. Cl. 131—189 40 Claims



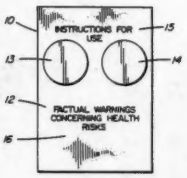
1. A cigarette filter modifier comprising:
a base shield;
a probe projecting from said base shield;
at least one aperture in said probe communicating with the interior thereof, said aperture opening laterally outwardly with respect to the length of said probe, in order that smoke being drawn from a cigarette into said probe aperture is forced to turn sharply with respect to the longitudinal axis of flow of smoke through a cigarette filter in order to enter said aperture, and is forced to turn another sharp turn in order to pass down the length of said interior passage of said probe;
each said aperture being sufficiently large to facilitate draw but less than about 0.1 inch in length along the longitudinal axis of said probe and the overall aperture area being less than about 0.0135 square inches;
an interior passage in flow communication with said probe aperture and extending through the interior of said probe at least from said probe aperture to and through said base shield, said interior passage being sufficiently large in cross-section to facilitate draw but being no greater than about 0.008 square inches;
said base shield being at least approximately as large in diameter as the diameter of a cigarette filter whereby passage of smoke is blocked by said shield and smoke is forced through said probe aperture and through said interior passage when a cigarette containing said probe is drawn upon.

4,877,041

CIGARETTE SUBSTITUTE FOR SMOKING CESSATION

Robert L. Barnhouse, 113 Almeria St., Royal Palm Beach, Fla. 33411

Filed Aug. 8, 1988, Ser. No. 230,003
Int. Cl.[4] A24F *47/00*
U.S. Cl. 131—270 14 Claims



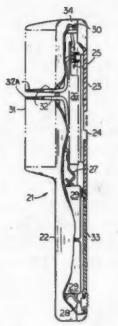
1. A cigarette substitute for smoking cessation comprising: a flat card-like member having at least one abrasable encapsulated smoke aroma area on one surface, including directions for use printing and health advisory printing on said one surface.

4,877,042

DYNAMIC HAIR GROOMING APPLIANCE

John H. Downey, 114 Sandy Heaven Dr., Scarborough, Ontario, Canada (M1W 3M9)

Continuation-in-part of Ser. No. 533,450, Sep. 19, 1983, abandoned. This application Apr. 14, 1987, Ser. No. 38,179
Int. Cl.[4] A45D *20/08*
U.S. Cl. 132—212 13 Claims



1. A dynamic hair grooming appliance comprising:
an axially elongated body portion;
hair engaging means supported from said body portion;
handle means from which said body is supported for moving said hair engaging means into selective contact with the hair of a person to effect the grooming thereof;
electrode means for contacting the hair interspersed with said hair engaging means and positioned remote from the distal ends thereof so as not to contact the scalp of a person during said grooming, and
circuit means located in said handle and electrically connected to said electrode means for measuring an electrical value at said electrode means related to the moisture content of hair contacted thereby, said circuit means further including signal means and means responsive to the attainment of a predetermined value at said electrode means for changing the state of operation of said signal means.

4,877,043

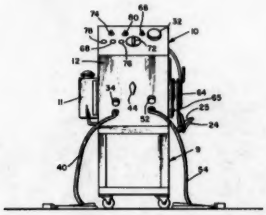
INTERNAL COMBUSTION ENGINE SCRUBBER

Maurice Carmichael, 23920 Anza Ave., Apt. 241, Torrance, Calif. 90505, and Janis Binatena, 4110 Lenora, Torrance, Calif. 90503

Continuation-in-part of Ser. No. 28,546, Mar. 20, 1987, abandoned. This application May 9, 1988, Ser. No. 191,395

Int. Cl.[4] B08B *3/08*

U.S. Cl. 134—57 R **16 Claims**



1. An apparatus for cleaning of carbon and other contaminants from a fuel distribution system and soft carbon and other contaminants from a combustion chamber of an internal combustion engine, wherein said engine includes a fuel pump, a fuel line, a fuel intake, and a return fuel line, wherein said apparatus operates at a pressure that defines an independent cleaning solution fuel system to temporarily replace an engine's fuel system, said apparatus comprising in combination:

a reservoir for holding cleaning solution therein;

means for pumping said cleaning solution from said reservoir into the fuel intake of the internal combustion engine, said means comprising:

a cleaning solution pump;

an output line connecting the cleaning solution pump and the fuel line of the engine at a point after the engine fuel pump to transport the cleaning solution to the fuel intake of the engine;

means for controlling said cleaning solution pump;

means connecting said apparatus to a power supply for said cleaning solution pumping means;

excess cleaning solution return means comprising:

a return line connecting the reservoir and the return fuel line of the engine to provide a conduit for returning excess cleaning solution from the engine to said reservoir; and

an adjustable return pressure regulator means mounted to the return line to adjust the pressure of the apparatus to a pressure required to start the engine using the cleaning solution in said reservoir as fuel for the engine.

4,877,044

TENT, TENT RIBS, AND METHOD OF ERECTING TENTS

Robert R. Cantwell, Leslie; Raymond F. Hallemann, and Deborah M. Zumsteg, both of New Haven, all of Mo., assignors to American Recreation Products, Inc., St. Louis, Mo.

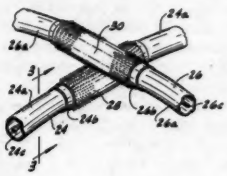
Filed Aug. 26, 1988, Ser. No. 236,846

Int. Cl.[4] E04H *15/40*

U.S. Cl. 135—104 **11 Claims**

1. An improved tent of the type comprising a fabric shell supported on a skeleton frame having at least two criss-crossing ribs, the improvement comprising:

patches of mating halves of hook-and-loop type fastening material on portions of the ribs that criss-cross, one half of the hook-and-loop material being attached to one of said two criss-crossing ribs and the other half of the hook-and-loop material being attached to the other of said criss-



crossing ribs, to releasably attach the ribs together at the point where they criss-cross and stabilize the frame.

4,877,045

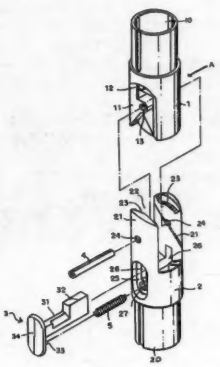
PIVOTAL POSITIONING MEANS FOR USE IN BEACH UMBRELLA

Chia-Hui Lin, Chiayi Hsien, Taiwan, assignor to Tai Yu Enterprise Co., Ltd., Chiayi Hsien, Taiwan

Filed Aug. 3, 1988, Ser. No. 228,668

Int. Cl.[4] A45B *17/00*

U.S. Cl. 135—20 M **2 Claims**



1. An improved pivotal positioning means for use as a joining knuckle of a shade or beach umbrella, comprising:

an upper element having a tubular shape with two opposite walls defined in flattened manner, one of the flattened walls being provided with a projected, flat engaging portion;

a through hole defined through the central portion of the upper element;

a plurality of spaced positioning grooves disposed a bottom edge of the other flattened wall;

a projection block disposed at a top edge of each of said flattened walls;

a hollow tube disposed in connection with a top end of said upper element;

a lower element having a tubular shape with a pair of upright lugs, and a slot being defined between said lugs so that said upper element can be received therein in assembly;

a countersink disposed near the bottom end of one of said lugs;

a groove defined right behind said countersink and through the lower element;

a deep hole disposed right below said groove;

an arcuate groove disposed at a top edge of each of said lugs for slideable engagement with said projection block in assembly;

a pivot pin for placement through the through holes of the

upper and lower elements in assembly so to permit the pivotal movement of said upper element with respect to the lower element;

a locking piece adapted to be inserted into said groove in said lower element for selective engagement in said positioning grooves, said locking piece having a front engagement end, a button end and a connecting portion between said front engagement end and said button end, said button end being adapted to be received in said counter sink and having a protrusion on an inner side thereof;

a spring having a first end adapted to be in engagement with said protrusion of said button end of said locking piece, and a second end adapted to be received in said deep hole of said lower element;

wherein the projection block of said upper element and said arcuate groove of said lower element in combination constitute said pivotal positioning means, which are able to limit the pivot angle of the upper element with respect to the lower element so that the over-tilting of the canopy can be prevented and the tilting operation can be performed in a more precise manner.

4,877,046

CLOSING AND INJECTION VALVE ESPECIALLY FOR HOT GAS DEFROSTING IN FREEZING AND COOLING INSTALLATIONS

Rolf H. Albrigtsen, Norge, and Per R. Samuelsen, Oslo, both of Norway, assignors to A/S Finsam International Inc., Oslo, Norway

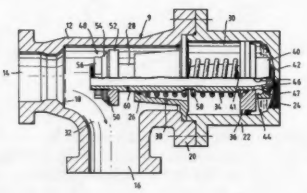
PCT No. PCT/NO87/00078, § 371 Date Aug. 15, 1988, § 102(e) Date Aug. 15, 1988, PCT Pub. No. WO88/04383, PCT Pub. Date Jun. 16, 1988

PCT Filed Dec. 8, 1987, Ser. No. 222,079

Claims priority, application Norway, Dec. 9, 1986, 864941

Int. Cl.[4] F16K *49/00*; F25B *41/04*

U.S. Cl. 137—107 **4 Claims**



1. A valve for shutting off or closing a main fluid flow through a main flow passage (32), comprising a valve stem (28) having a valve head (48) which may be operated to engage a valve seat (18) in order to close said passage, the valve stem carrying at the end remote from the valve head a piston (36) which operates in a cylinder (22) and can be actuated by a closing fluid against spring action in order to move the valve stem (28) and the valve head (48) into closed position, characterized in that the valve stem (28) is hollow and at the end at which the valve head (48) is provided, is open and at the opposite end has openings (46) opening into the interior of the hollow valve stem (28), and that the piston (36) is mounted for axial movement on the valve stem (28) to allow further movement towards the valve seat (18) against spring action when the valve head (48) has engaged the valve seat (18) and the valve stem (28) has therefore come to a halt, said further movement relative to the valve stem (28) opening a passage (45) into the openings (46) in the valve stem (28), whereby closing fluid will be injected into the main flow passage (32) at one side of the valve seat (18) through the valve stem.

4,877,047

CONTROL MECHANISM FOR CONTROLLING THE WATER SUPPLY IN AN IRRIGATION SYSTEM AND SIMILAR, OPERATING BY MEANS OF PRESSURE PULSES

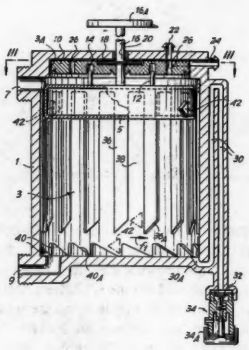
Guido Isidoro, Fraz.Com.S.Casciano V.di Pesa, Via per Cerbaia, 8A, Frienze, Italy

Filed Oct. 17, 1988, Ser. No. 259,040

Claims priority, application Italy, Oct. 16, 1987, 9514 A/87

Int. Cl.[4] F16K *11/02, 31/18*

U.S. Cl. 137—119 **10 Claims**



1. A control mechanism for controlling a water supply by means of pressure pulses in a water supply pipe which is capable of preventing erroneous commands caused by brief accidental pulses, comprising: a housing defining a chamber having a liquid inlet and chamber port means; a shutter in the chamber mounted for rotation and reciprocation, the shutter having shutter port means therein for registering with the chamber port means in the housing in various rotative positions of the shutter; a float positioned in the chamber operatively connected to the shutter to cause reciprocation and rotation of the shutter in response to reciprocation and rotation of the float; cam means connected to the float and connected to the housing, said cam means cooperating to effect stepped rotation of the float and shutter in response to each reciprocation thereof from an upper position to a lower position and back to the upper position in the chamber, liquid iphon discharge means connected to the chamber for discharging liquid from the chamber, a flow metering device for regulating liquid discharge through said siphon discharge means to provide a slow discharge of liquid to permit the siphon discharge means to slowly discharge liquid from the chamber in response to release of pressure in the chamber.

4,877,048

WHEEL END VALVE FOR CENTRAL TIRE INFLATION SYSTEM

Jerry M. Oltean, Ontario, Canada, and Paul E. Goodwin, Southfield, Mich., assignors to Eaton Corporation, Cleveland, Ohio

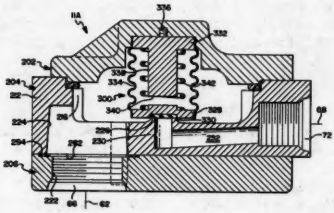
Filed Oct. 14, 1988, Ser. No. 257,594

Int. Cl.[4] B60C *29/00*

U.S. Cl. 137—225 **4 Claims**

1. A central tire inflation system comprising a wheel end valve assembly including a valve body having a first fluid connection defined by a first port connected to a selectively pressurized and exhausted conduit, a second fluid connection defined by a second port connected to an interior pressurized chamber of an inflatable tire, said valve assembly comprising a valve means responsive to pressurization of said selectively pressurized and exhausted conduit to assume an opened position for establishing fluid communication between said first

and second ports and responsive to exhausting to atmosphere of said selectively pressurized and exhausted conduit to assume a closed position for blocking fluid communication between said first and second ports thereof, said valve means comprising a valve seat and a valve head having a sealing means for sealing said head to the valve seat when said valve means is closed, said valve characterized by:



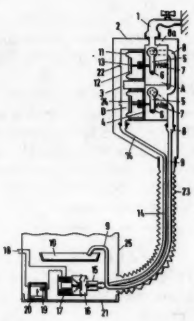
an elongated bellows having an end secured to said head and an end secured to a base which is secured to said valve body and an elongated spring means located internally of said bellows and extending between said valve head and said valve base to resiliently bias said valve means into said closed position.

4,877,049

PNEUMATIC, WATER LEAKAGE SAFETY DEVICE FOR WASHING MACHINES

Paolo Fornasari, Alessandria, Italy, assignor to Eltek, S.p.A., Alessandria, Italy

Filed Oct. 14, 1988, Ser. No. 259,362
Claims priority, application Italy, Oct. 23, 1987, 67883-A/87
Int. Cl.[4] F16K *31/122, 31/126, 33/00*; H01H *35/18*
U.S. Cl. 137—312 **9 Claims**



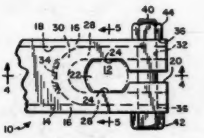
1. A pneumatic, water leakage safety device designed for domestic and/or industrial washing machines having a housing containing at least one pneumatically-actuated valve controlling the entry of water into the tub of said washing machine; said at least one valve being actuated, power supply means; at least one calibrated spring which reacts against the movement of the at least one valve in response to the compressed air acting upon said at least one valve; an electric switch associated with a float being included in the power supply means of said pump; said float being positioned so as to rise due to the effect of leakage water collecting in a tray due to machine malfunctions said float causing said switch to open shutting off the power supply to said pump and that of the washing machine.

4,877,050

VALVE HANDLE

Carl B. Harris, Rutland, Mass., assignor to Thomas Smith Co. Inc., Worcester, Mass.

Filed Oct. 28, 1988, Ser. No. 264,336
Int. Cl.[4] F16K *31/00*; G05G *1/10*
U.S. Cl. 137—315 **6 Claims**



1. A valve handle for effecting rotation of a valve stem having spaced, parallel sides, said valve handle being structured to be applied to the valve stem at right angles to the axis of the valve stem and extending radially from the axis of the valve stem, said valve handle comprising an elongate, rigid bar of U-shaped cross section embodying a substantially flat back part and transversely-spaced, parallel, flat side parts perpendicular to the back part and connected, respectively, at one edge to the opposite edges of the back part, said back part containing adjacent one end an opening situated midway between the side parts, said opening being spaced from said one end and embodying transversely-spaced, parallel edges and longitudinally-spaced arcuate edges for non-rotatably receiving the stem, said spaced, parallel edges of said openings being parallel to said flat side parts and said longitudinally-spaced, arcuate edges being disposed transversely of the flat back part, said opening being spaced from the end of the handle and said back part containing a medially-disposed slot extending from the arcuate end adjacent said end of the handle to the end of the handle and said side parts containing transversely-aligned holes midway between the upper and lower edges of the side parts and a U-shaped clamp embodying spaced, parallel sides corresponding in width to the width of the spaced, parallel side parts of the handle and an integral, semicircular end part joining the ends of the spaced, parallel side parts at one end, said U-shaped clamp being dimensioned to be received between the flat side parts of the handle with its ends coinciding with the ends of the side parts of the handle and with its semicircular end part disposed within the handle between the spaced, parallel side parts of the handle such that the semicircular end part extends beyond the opening in the flat back part such that when the handle is applied to the stem, the stem will be situated between the side parts of the handle forwardly of the semicircular back part and said side parts containing transversely-disposed openings so situated as to coincide with the openings in the spaced, parallel sides of the handle and a bolt disposed transversely of the handle within the openings in the handle and the U-shaped clamp, provided with a head at one end and a nut at the other end by means of which the side parts of the U-shaped clamp can be drawn into clamping engagement with the spaced, parallel sides of the valve stem, said opening being situated substantially midway between the arcuate back part and the clamping bolt such as to apply gripping pressure uniformly to the flat sides of the stem.

4,877,051

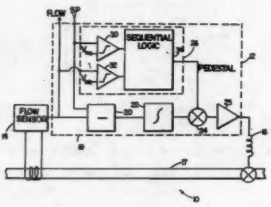
FLOW CONTROLLER

Christopher C. Day, Newtonville, Mass., assignor to MKS Instruments, Inc., Andover, Mass.

Filed Nov. 28, 1988, Ser. No. 277,030
Int. Cl.[4] G05D *7/06*
U.S. Cl. 137—486 **17 Claims**

1. A fluid flow control apparatus comprising

a fluid flow control valve being configured to be located in a fluid path and controlled by a control signal,
a fluid flow sensor, said fluid flow sensor configured to sense fluid flow in the fluid path, and output an actual flow signal indicative thereof, and
a fluid flow control circuit,
said fluid flow control circuit configured to control said fluid flow control valve,
said fluid flow control circuit including
an actual control circuit configured to compare said

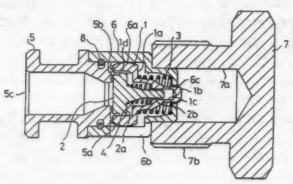


actual flow signal with a desired flow signal and produce a signal related to this comparison,
a desired flow comparator circuit configured to compare said desired flow signal with a desired flow threshold signal and provide a desired flow comparator output indicative of this comparison, and
a summing circuit configured to receive said signal related to the comparison of said actual flow signal with said desired flow signal and a signal related to said desired flow comparator output, and provide said control signal based on said signals.

4,877,052
CHECK VALVE

Kamimura Toshio, and Ito Koji, both of Gifu, Japan, assignors to Teijin Seiki Co., Ltd., Osaka, Japan

Filed May 12, 1988, Ser. No. 193,405
Claims priority, application Japan, May 14, 1987, 62-72307[U]
Int. Cl.[4] F16K *15/02*
U.S. Cl. 137—512.3 **2 Claims**

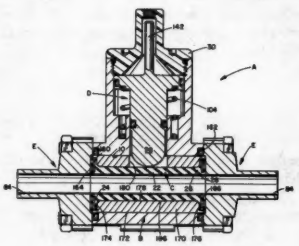


1. A check valve comprising
(a) a case including:
(i) a hollow portion,
(ii) an inner sliding surface,
(iii) an inlet port,
(iv) an outlet port,
(v) a first planar sealing means located in a first plane,
(vi) a second planar sealing means which is concentric with and surrounds said first planar sealing means and which is located in said first plane, and
(vii) an opening;
(b) an outer flat top poppet including:
(i) a head portion in sliding engagement with the inner sliding surface of the case,
(ii) a shaft portion extending from said head portion and through the opening in the case,
(iii) a flat top, and
(iv) a recess defined by an inner wall;
(c) an inner flat top poppet including:
(i) a head portion in sliding engagement with the inner wall of the outer flat top poppet,
(ii) a shaft portion extending from the head portion of the inner flat top poppet and in the recess of the outer flat top poppet, and
(iii) a flat top; and
(d) spring means for biasing the flat tops of said inner and outer flat top poppets into sealing engagement with said first and second planar sealing means, respectively.

4,877,053
PINCH VALVE

Edward M. Yusko, Jr., Denmark; Cal R. Brown, Euclid; Terry M. Kalain, Willoughby, and Peter C. Williams, Cleveland Heights, all of Ohio, assignors to Whitey Co., Highland Heights, Ohio

Continuation-in-part of Ser. No. 177,971, Apr. 5, 1988, Pat. No. 4,800,920. This application Sep. 30, 1988, Ser. No. 252,257
Int. Cl.[4] F16K *37/00*; F16L *55/14*
U.S. Cl. 137—556 **13 Claims**



1. A valve comprising:
a body having a bore extending therethrough;
a flexible member received in said bore and having a passage defined therethrough adapted to be selectively opened and closed;
a casing member received around said flexible member and having an outer diametrical dimension adapted for close receipt in said bore, said casing member including an aperture extending through a sidewall thereof; and,
an actuating member adapted for close receipt through said aperture for selectively engaging said flexible member and opening and closing said passage.

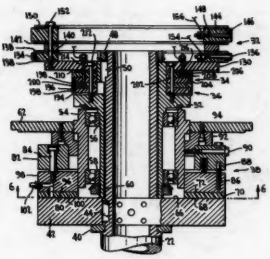
4,877,054
ROTARY VALVE ASSEMBLY

John Walter, Evergreen Park, Ill., assignor to Continental Can Company, Inc., Norwalk, Conn.

Division of Ser. No. 207,500, Jun. 16, 1988, Pat. No. 4,830,048. This application Jan. 31, 1989, Ser. No. 304,181
Int. Cl.[4] F16K *11/02*
U.S. Cl. 137—560 **3 Claims**

1. A valve assembly for use in a multiple work station machine, said machine including a rotating shaft carrying a plurality of work stations, each work station requiring a separate multiple fluid supply, said valve assembly comprising a manifold plate separately mounted on said shaft for rotation with said shaft, said manifold plate having a cylindrical surface and a flat surface, plural sets of fluid delivery ports in said manifold plate extending from said flat surface to said cylindrical surface, there being a set of fluid delivery ports for each work station, an annular supply manifold having a flat surface facing said manifold plate flat surface and a cylindrical surface, a set of fluid supply ports extending through said supply manifold

from said supply manifold cylindrical surface to said supply manifold flat surface, mounting means mounting said supply manifold on said rotating shaft in a fixed non-rotating position, and an annular seal carried by said supply manifold and engaging said flat surfaces in sealed relation, said seal having a first flat surface engaging said supply manifold flat surface, said first flat surface having individual supply ports opening there-



through in alignment with said fluid supply ports, said seal having a second flat surface engaging said manifold plate flat surface, said seal having in said second flat surface accurate grooves disposed in continuous communication with said seal supply ports and being periodically alignable with said manifold plate delivery ports as said manifold plate rotates relative to said seal.

4,877,055

LEAKAGE DEVICE FOR THE DRAINAGE OF A DIAPHRAGM ACCUMULATOR

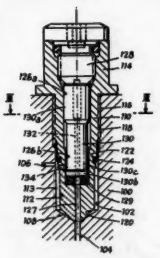
Pierre Knuchel, Germigny L'Eveque, and Jacques Nollez, Paris, both of France, assignors to Bendix France, Drancy, France

Filed Jan. 9, 1989, Ser. No. 294,081

Claims priority, application France, Feb. 5, 1988, 88 01331; Apr. 28, 1988, 88 05656

Int. Cl.[4] F16L *55/04*

U.S. Cl. 137—568 **17 Claims**



1. A leakage device in a process for emptying a diaphragm accumulator whose diaphragm is adapted to be applied against at least a part of an inside wall of the accumulator in the absence of pressure, said accumulator being disposed in a hydraulic circuit including a low-pressure reservoir, and a pump pumping liquid from the reservoir to feed a pressurized circuit including said accumulator, process according to which a leak of said liquid from said circuit to said low-pressure reservoir is maintained with a predetermined rate of flow, said leakage device, comprising a body provided with a chamber, an inlet aperture for connection to the hydraulic circuit, an outlet aperture for connection to the lowpressure reservoir, and a plunger mounted in said chamber, the plunger being provided with means defining a leak path between the inlet aperture and the outlet aperture.

4,877,056

DIGITAL VALVE

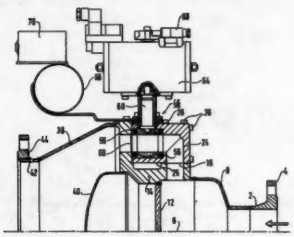
Gilles Comte, Chelles, and Andre Viode, Saint-Etienne, both of France, assignors to Societe Anonymes dite: SOGELERG, Rungis Cedex, France and Societe Nouvelle Auxim, Saint-Etienne, France

Filed Mar. 30, 1989, Ser. No. 330,577

Claims priority, application France, Mar. 31, 1988, 88 04305

Int. Cl.[4] G05D *7/03*

U.S. Cl. 137—599 **8 Claims**



1. A digital valve comprising:

an inlet duct disposed on a valve axis in order to receive a fluid at an upstream pressure via an upstream side, and an outlet duct disposed on the same axis in order to allow said fluid to leave via a downstream side under a downstream pressure which is substantially smaller;

a plurality of shutters, each serving, when open, to disengage an orifice allowing a flow of said fluid to pass from said inlet duct to said outlet duct at a rate which is individual to said shutter, and serving, when closed, to prevent said flow;

a valve body forming a plurality of seatings angularly distributed around said valve axis around a ring of shutters, with the diameter of the ring being greater than the diameter of said inlet duct, at least, said seatings each receiving a corresponding one of said shutters in such a manner as to connect said shutters in parallel between said inlet duct and said outlet duct so that the flows through open shutters are added together; and

a plurality of actuators each for actuating a corresponding one of said shutters;

wherein:

each of said seatings in said valve body is in the form of a re-entrant dihedral angle open outwardly and in the upstream direction, one side of said angle being constituted by an inlet wall disposed on the radially inside side of the corresponding one of said shutters and extending along a circumferential direction and along a direction which is axial or outwardly oblique, and on the other side by an outlet wall disposed downstream from said shutter and extending along a circumferential direction and along a direction which is radial or oblique towards the downstream direction;

each of said shutters is incorporated in a corresponding shutter module having two bearing faces forming a projecting dihedral angle of the same value as said re-entrant dihedral angle;

module fixing means removably fix each of said shutter modules to bear via said bearing faces against said inlet and outlet walls of its seating;

said inlet and outlet walls of each of said seatings and said corresponding shutter module incorporating one of said shutters, form, for said fluid, when said shutter is open, a bent duct having an inlet branch substantially perpendicu-

lar to said inlet wall and an outlet branch substantially perpendicular to said outlet wall, enabling said fluid to penetrate into an outlet chamber which is common to at least a plurality of said seatings, and which communicates with said outlet duct or is constituted thereby; and

sealing means are provided between said bearing faces of said module and said walls of its seating around said inlet and outlet branches.

4,877,057

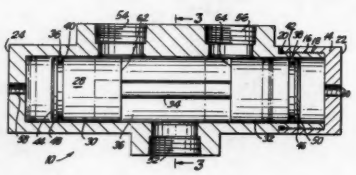
PRESSURE EQUALIZING VALVE

Bruce C. Christensen, Marinette, Wis., assignor to Wormald, U.S. Inc., Marientte, Wis.

Division of Ser. No. 839,143, Mar. 12, 1986, Pat. No. 4,722,358. This application Nov. 13, 1987, Ser. No. 120,014

Int. Cl.[4] G05D *11/03*

U.S. Cl. 137—625.48 **10 Claims**



1. A pressure equalizing valve, comprising:

a valve body with first and second end faces, said body having a longitudinally disposed bore therein, an inlet port for receiving a first pressurized fluid therethrough, an outlet port for transporting said first fluid downstream of said valve, a by-pass outlet port for transporting said first fluid away from said outlet port, a first sense port disposed in said first end face for sensing the pressure of said first fluid downstream of said valve, a second sense port disposed in said second end face for sensing the pressure of a source of a second pressurized fluid to be mixed with said first fluid downstream of said valve, said ports in fluid communication with said bore;

spool means longitudinally disposed within said bore, said spool means formed with first and second piston means having first and second faces, respectively, said spool means freely translateable within said bore in response to a pressure differential between fluids at said first and second sense ports so as to allow said piston means to regulate the flow of said first fluid through said outlet and by-pass ports such that said first and second fluids maintain substantially equal pressures downstream of said valve; and

first and second sealing means disposed proximate said first and second faces of said piston means, respectively, for sealing said inlet port , said outlet port , and said by-pass port from fluid communication with said first and second sense ports .

4,877,058

SPOOL VALVE

Kurt Stoll, Esslingen, Fed. Rep. of Germany, assignor to Festo KG, Esslingen, Fed. Rep. of Germany

Filed Sep. 20, 1988, Ser. No. 246,700

Claims priority, application Fed. Rep. of Germany, Oct. 9, 1987, 3734136

Int. Cl.[4] F15B *13/042*; F16K *31/126*

U.S. Cl. 137—625.48 **13 Claims**

1. A valve comprising:

a valve housing having opposite wall portions;

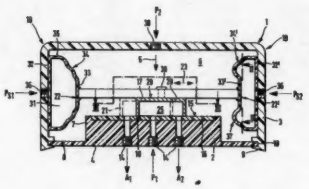
a connection plate having a sealing surface, the connection plate being attached to said housing with the sealing surface facing into said housing;

ducts extending through said connection plate;

ports at the ends of respective ducts and opening into said sealing surface;

a flat spool having opposite ends mounted for reciprocation along an axis parallel to said sealing surface passing through said opposite wall portions and said opposite ends so as to slide across said surface, connecting together and isolating selected of said ports from each other;

means for effecting said reciprocation of said spool comprising:



a pair of bellows in the housing connected between respective opposite ends of the spool and said opposite wall portions, providing operating surfaces attached to the spool in all reciprocal positions thereof;

means for supplying an operating fluid to each of said bellows for expanding one bellows while contracting the other thereby effecting reciprocation of the spool, the spool being suspended by the attachment to the bellows for float thereof laterally of the axis of reciprocation; and,

biassing means urging the flat spool against the sealing surface in all reciprocal positions thereof.

4,877,059

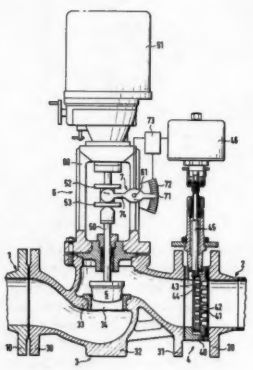
VALVE

Ian C. Popescu, Krefeld, and Rainer Lange, Neuburg/Donau, both of Fed. Rep. of Germany, assignors to Schubert & Salzer, Ingolstadt, Fed. Rep. of Germany

Filed May 6, 1988, Ser. No. 190,709

Int. Cl.[4] F16K *37/00*

U.S. Cl. 137—637.1 **8 Claims**



1. An adjustable flow valve for regulating the flow of liquids, comprising:

(a) a valve seat having an opening through which the liquid flows;

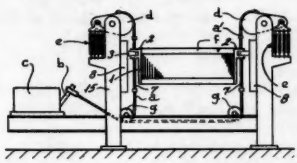
(b) an adjustable closing element, adapted to vary the liquid flow through said valve seat;
(c) a flow divider disposed within the liquid flow path adjacent to said valve seat, having adjustable apertures for regulating the flow of the liquid and for dividing the liquid into a plurality of streams, and means for regulating the size of said apertures;
(d) sensing means for sensing the position of the closing element; and
(e) control means, responsive to said sensing means, for varying the size of the apertures in said flow divider in response to variations in the position of said closing element to reduce cavitation noise and wear on the valve.

4,877,060

DEVICE FOR COUPLING HEDDLE FRAMES TO THE TRANSMISSION ELEMENTS OF A MECHANISM FOR FORMING THE SHED

Jean-Paul Froment, Doussard, and Joseph Palau, Duingt, both of France, assignors to S.A. Des Etablissements Staubli (France), Faverges, France

Filed Jun. 13, 1988, Ser. No. 205,839
Claims priority, application France, Jun. 26, 1987, 87 09275
Int. Cl.[4] D03C *13/00*
U.S. Cl. 139—82 **13 Claims**



1. A coupling device for connecting the uprights of a heddle frame to a motion transmission element in a weaving loom wherein the uprights are disposed along a plane and the motion transmission element includes an elongated axis comprising, a male tenon member and a female mortise member, one of said members being connected to the upright of the heddle frame and the other of said members being connected to the motion transmission element, said one of said members including an open slot along the plane of the upright to form at least one pair of opposing and outwardly extending arm elements, said other of said members being selectively seated between said arm elements so that the axis of the motion transmission element passes through said slot and intermediate said arm elements whereby forces distributed along the axis of the motion transmission element are distributed to said members to thereby prevent shifting of said said members with respect to one another.

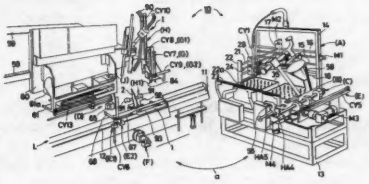
4,877,061

AUTOMATIC COP EXCHANGING APPARATUS FOR SHUTTLE LOOM

Takao Yarita, Chiba; Hideo Komori, Ibaraki; Koji Ogasawara, and Hiroaki Takami, both of Kanagawa, all of Japan, assignors to Ichikawa Woolen Textile Co., Ltd., Tokyo, Japan

Filed Jun. 16, 1988, Ser. No. 207,484
Claims priority, application Japan, Jun. 16, 1987, 62-148063; Jun. 26, 1987, 62-157834; Jun. 30, 1987, 62-161024; Jun. 30, 1987, 62-161025
Int. Cl.[4] D03D *45/00, 45/50*; B65H *67/00*
U.S. Cl. 139—224 R **9 Claims**

1. An automatic cop exchanging apparatus for exchanging a cop on which weft yarn is wound in a loom for producing woven material in which a shuttle is passed between an upper warp and a lower warp, comprising:
cop pick up means for picking up a new cop and delivering said new cop to a predetermined position;
cop setting means for picking up an old cop within said shuttle, receiving said new cop delevered by said pickup means, and setting said new cop in said shuttle;



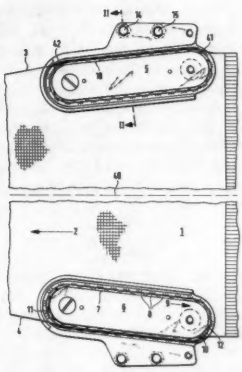
thread processing means for processing threads of said new and old cops by making said threads of said new and old cops coincide in position;
tying means for tying said ends of said threads together; and
reel means for dispersing the position of knot portions of the tied threads through said woven material.

4,877,062

TEMPLE

Tilman Hoefelmayr, Steinwichslenstr. 20, CH-9052 Niederteufen, Switzerland

Filed Sep. 25, 1987, Ser. No. 101,363
Claims priority, application Fed. Rep. of Germany, Sep. 26, 1986, 3632821
Int. Cl.[4] D03J *1/22*
U.S. Cl. 139—294 **24 Claims**



1. A temple for securing a woven fabric advanceable in a weaving apparatus, the temple comprising endless guide means having displaceably arranged therein a plurality of discrete, unconnected members provided with needles for engagement with said woven fabric, said guide means providing a displacement path along which said members are constrained to travel between a fabric needling-in position and a fabric de-needling position, said displacement path being angularly inclined with respect to a longitudinal axis of the woven fabric and convergent in the direction of advancement of the fabric, the displacement path being arranged such that the needles of at least two members are simultaneously in engagement with an edge of the woven fabric and that, in the course of fabric needling-in, the needles brought into engagement with the woven fabric are located at a greater distance from the longitudinal axis of the width of woven fabric than they are in the course of fabric

de-needling characterized in that the members are supported in such a way that they can be displaced relative to one another such that the aggregate amount of space between all members on the endless guide means is at least as great as the amount of fabric elongation between the needling-in position and the de-needling position, there being means provided for holding within a predetermined distance one of said plurality of members adjacent the member in the needling-in position.

4,877,063

MAIN INJECTOR WITH INCREASED TENSIONING FORCE, FOR AIRJET WEAVING MACHINES

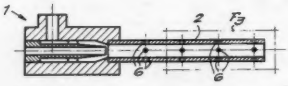
Jozef Verhulst, Zillebeke, Belgium, assignor to Picanol N.V., Ypres, Belgium

Continuation of Ser. No. 127,060, Dec. 1, 1987, abandoned. This application Mar. 28, 1989, Ser. No. 331,084

Claims priority, application Netherlands, Dec. 2, 1986, 8603069

Int. Cl.[4] D03D *47/30*

U.S. Cl. 139—435 18 Claims



1. An apparatus for fluidly injecting a weft thread into a shed of a weaving loom with increased tensile force exerted on the weft thread comprising:

a main injection nozzle having a weft admission passage, a fluid pressure admission passage, and an exit passage; and

a fluid jet injection tube of predetermined length and constant cross section diameter fixedly disposed coaxially to the exit passage of the main nozzle and adjacent the exit outlet of the main nozzle, and having at least one group of fluid outlet openings in direct communication with ambient atmosphere extending through the wall of the tube and positioned symmetrically to the axis of the tube, the outlet openings of said at least one group intersecting a single plane extending transversely perpendicular to the axis of the tube, whereby pressurized fluid passing through the tube will egress equally from each of the openings of the group symmetrically to the axis of the tube.

4,877,064

DEVICE FOR THE AUTOMATIC CONTROL OF THE WEFT YARN FEED IN AIR LOOMS

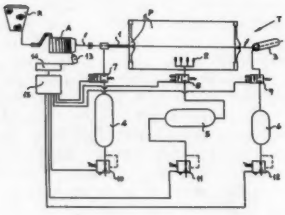
Luigi Pezzoli, Leffe, Italy, assignor to Vilminore Officine Meccaniche S.P.A., Vilminore Di Scalve, Italy

Filed Jan. 22, 1988, Ser. No. 147,310

Claims priority, application Italy, Jan. 26, 1987, 19157 A/87

Int. Cl.[4] D03D *47/30, 47/36*

U.S. Cl. 139—435 7 Claims



1. In an air loom, the combination comprising:

weft yarn feeding means for feeding the weft yarn from a spool;

means for moving said weft yarn through a shed of said loom, said means comprising multiple air jet nozzles or sets of nozzles blowing air along said shed from air supply means;

sensing means, positioned at the outlet of the feeding means, to sense the time required for each turn or part of a turn of said weft yarn leaving said feeding means to unwind, said sensing means generating a signal in response to said sensing;

a programmable control circuit, to control said movement of said weft yarn through said shed, which circuit supplies reference values according to predetermined weft yarn unwinding times; and

comparator means, to compare said signals generated by said sensing means with said reference values and to adjust air blowing parameters of the air jet nozzles, either in response to differences existing between said compared signals and values so as to reduce said differences, or in order to obtain the most economical adjustment of said parameters which will avoid said differences.

4,877,065

DECANTING DEVICE FOR LIQUIDS, E.G. PERMANENT WAVE AGENTS

Peter Lamboy, Welterstadt; Franz Steigerwald, Griesheim; Karlheinz Zulauf, Hoechst-Hassenroth, all of Fed. Rep. of Germany, and Harmut Ginnow-Markert, Minneapolis, Minn., assignors to Wella Aktiengesellschaft, Darmstadt, Fed. Rep. of Germany

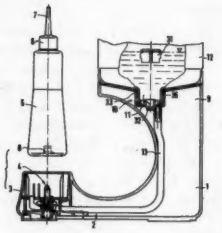
PCT No. PCT/EP83/00075, § 371 Date Jan. 26, 1984, § 102(e) Date Jan. 26, 1984, PCT Pub. No. WO83/03234, PCT Pub. Date Sep. 29, 1983

PCT Filed Mar. 16, 1983, Ser. No. 557,281

Claims priority, application Fed. Rep. of Germany, Mar. 19, 1982, 3210154

Int. Cl.[4] B65B *3/06, 3/16*

U.S. Cl. 141—18 21 Claims



1. A device for decanting liquids, particularly liquid permanent wave agents, from a storage container provided with a dispensing closure into a receiver container provided at a base thereof with a filling closure and a discharge nozzle at which the receiver container is vented, comprising a frame having a lower part (2) and an upper part forming a support (9) for the storage container; a filling valve (4) connectable to the filling closure and including a base (15), a hollow filling tube (14) which projects upwardly from the base and is insertable into the filling closure of the receiver container when the latter is placed with its base onto the base of the filling valve, and at least one spring-loaded valve actuator (17) projecting upwardly from the base of the filling valve so that it is pressed by the base of the receiver container when the latter is placed onto the base of the filling valve to open said filling valve; a dispensing connector (10) connectable to said dispensing closure and mountable on said support so that it is positioned laterally

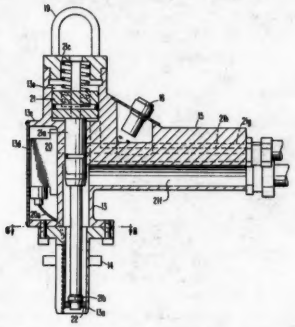
offset of and above and at a vertical distance from said filling valve; and means for venting said storage container.

4,877,066

APPARATUS FOR FILLING TRANSMISSION FLUID INTO TRANSMISSIONS

Shigeo Okamizu, Southgate, Mich., assignor to Mazda Motor Manufacturing (USA) Corporation, Flat Rock, Mich.

Filed Aug. 31, 1988, Ser. No. 239,615
Int. Cl.[4] B65B *57/00*; G01N *21/26*
U.S. Cl. 141—96 9 Claims



1. A filling apparatus for filling liquid into a container for the liquid to either of at least two levels, comprising:

a liquid pouring gun unit having means for dispensing a liquid and a sensor thereon for sensing that the distance of a surface of the liquid in said container from the end of the dispensing means closest to the liquid is a predetermined distance, said sensor including means for producing a signal when said distance is sensed;

a liquid supply line connected to said liquid pouring gun unit, said liquid supply line having a liquid controlling valve means therein and liquid flow amount determining means for determining the amount of liquid which is flowing in said liquid supply line; and

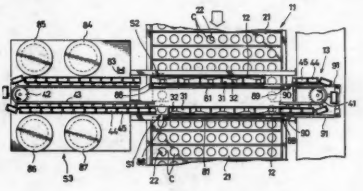
controller means to which said sensor and said liquid flow amount determining means are connected, and connected to said liquid controlling valve means, and including means for setting said controller means for actuation at either of at least two levels, and further including means for actuating said liquid controlling valve means, when said setting means is set for a first level, to close said liquid controlling valve means in response to the signal from said sensor, and for actuating said liquid controlling valve means, when said setting means is set for a second level, for closing said liquid controlling valve means only after said liquid flow amount determining means has determined that a predetermined amount of liquid has flowed through said liquid supply line after receipt of the signal from said sensor.

4,877,067

APPARATUS FOR DISTRIBUTEDLY FILLING PARTICULATE OR GRANULAR MATERIAL INTO CONTAINERS

Masao Shimokawa, and Hisanori Hamada, both of Tokushima, Japan, assignors to Shikoku Kakoki Co., Ltd., Tokushima, Japan

Filed Sep. 21, 1988, Ser. No. 247,192
Claims priority, application Japan, Sep. 25, 1987, 62-146568[U]
Int. Cl.[4] B65B *43/42*
U.S. Cl. 141—129 4 Claims



1. An apparatus for distributedly filling a particulate or granular material into containers comprising:

an apparatus frame having first and second filling stations,

a container conveyor having an even number of spaced container transport paths extending through the first and second filling stations, the container conveyor being adapted to be driven intermittently so as to stop containers at the first and second filling stations during transport,

first chutes equal in number to one-half of the number of container transport paths and so arranged and spaced as to have their lower-end openings disposed above the respective containers stopped at the first filling station in the even-numbered transport paths as arranged from one side of the container conveyor,

second chutes equal in number to one-half of the number of container transport paths and so arranged and spaced as to have their lower-end openings disposed above the respective containers stopped at the second filling station in the odd-numbered transport paths as arranged from said one side of the container conveyor,

a particulate or granular material conveyor having an endless material transport path including a forward path portion and a return path portion, the path portions extending across and being positioned above the even number of spaced container transport paths, the material conveyor having a chain extending along the material transport path and first and second buckets arranged alternately and attached to the chain at the same spacing as the container transport paths, the buckets being movable above the upper-end openings of all the first chutes when traveling through the forward path portion and above the upper-end openings of all the second chutes when traveling through the return path portion, the material conveyor being so driven continuously that each time the container conveyor is intermittently driven, each bucket moves by a distance equal to the spacing between adjacent chutes multiplied by the number of first or second chutes, a number of said first buckets being positionable above the upper-end openings of the respective first chutes and a number of said second buckets being positionable above the upperend openings of the respective second chutes when containers being transported are stopped at the first and second filling stations, and

means operable only one each time the container conveyor is intermittently driven to place the particulate or granular material into the first and second chutes respectively from the first and second buckets positioned above the upper-end openings of the first and second chutes while the

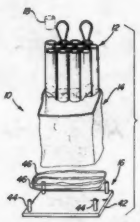
containers are stopped at the first and second filling stations.

4,877,068

BAG LOADER AND BAG FOR BEVERAGE CANS

Gregory L. Blake, 1508 Humphrey, Birmingham, Mich. 48008

Filed Jul. 15, 1988, Ser. No. 219,183
Int. Cl.[4] B65B 67/04
U.S. Cl. 141—390 6 Claims



1. A receptacle for empty beverage cans comprising:

a bag loader comprising a cluster of rigid cylindrical, vertically extending, tubes all having the same diameter with open top and bottom ends, said tubes being arranged in three parallel rows comprising two outer rows and an inner row therebetween with four tubes in each row, the adjacent tubes in each row being contiguous, the two outer rows being spaced from each other with each tube in one outer row being centered on a line perpendicular to the other outer row, the inner row of tubes being offset from the outer rows along the row direction by one-half diameter of a tube with each tube thereof nested and contiguous with adjacent tubes in the outer rows, each of the tubes having a diameter slightly larger than a beverage can and a length greater than two cans, and means for holding said tubes in said cluster,

a standard paper grocery bag of one-sixth barrel size having a rectangular opening slightly smaller in both dimensions than a rectangle circumscribing said cluster,

said bag loader being inserted into said bag with said bag distorted sufficiently from a rectangular shape to accommodate the nonrectangular shape of said cluster,

a rubber band adapted to be stretched around said bag,

whereby beverage cans may be stacked in each tube and the bag loader may be pulled out of said bag to leave said cans stacked in rows.

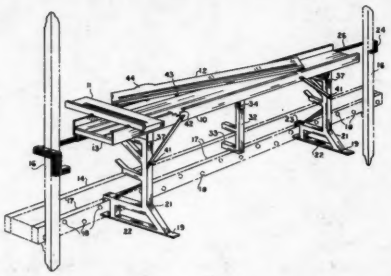
4,877,069

CUTTING TABLE

Stephen C. Plumley, 5312 Gallatin St., Hyattsville, Md. 20781

Filed May 17, 1988, Ser. No. 194,981
Int. Cl.[4] B25H 1/00
U.S. Cl. 144—286 R 6 Claims

1. A scaffold mountable saw table assembly comprising in combination, a bedplate, a crosscut sawing guide and an angular sawing guide, each being adapted for movable mounting relative to said bedplate, a plurality of spaced, retractably mounted table leg members, a plurality of locking means on said bedplate allowing for engagement with vertical posts of a scaffold to which said saw table may be mounted, and a plurality of scaffold platform engaging hooks disposed on said table



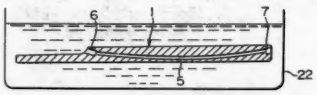
leg members for releasable attachment to a side of a longitudinally extending rail "I" beam of a scaffold platform.

4,877,070

METHOD OF REINFORCING A GUITAR NECK

Nobuaki Hayashi, 5882-2, Sasaga, Matsumoto City, Nagano Prefecture, Japan

Filed Jul. 15, 1988, Ser. No. 219,254
Claims priority, application Japan, Feb. 22, 1988, 63-37574
Int. Cl.[4] B27M 1/00; B27K 1/00
U.S. Cl. 144—364 7 Claims



1. A method for reinforcing a guitar neck comprising: preliminary bending the guitar neck into an arcuate shape; forming a long straight aperture for an adjusting rod within the neck over substantially all of its length by a laser beam or a long drill and at the same time forming a spot facing for a nut and another spot facing for a head of the adjusting rod at the sides of the long aperture; submerging the guitar neck within a resin in a vacuum pan or an autoclave to promote resin impregnation into the interior of the neck portion; polymerizing the guitar neck with a heat energy polymerizing apparatus; inserting the adjusting rod into the long aperture; and fitting the nut on the end of the rod to adjust to a desired correcting tension.

4,877,071

THREE LAYER CUSHION TIRE

Motoshi Tanigawa, Himeji; Hidehiko Dohi, Takasago; Takashi Nishimura, Kobe; Kouji Ichikawa, Nishinomiya, and Tetsuo Koishi, Kobe, all of Japan, assignors to Sumitomo Rubber Industries, Ltd., Hyogo, Japan

Filed Mar. 4, 1988, Ser. No. 164,218
Claims priority, application Japan, Mar. 6, 1987, 62-52595
Int. Cl.[4] B60C 5/00
U.S. Cl. 152—165 7 Claims

1. A cushion tire having a triple layered structure comprising a base layer of hard rubber, a middle layer of soft rubber and a tread layer of rubber arranged in that order in a radially outward sequence from the base layer to the tread layer,

the section height of said base layer being in the range of 15 to 40% of the tire section height,

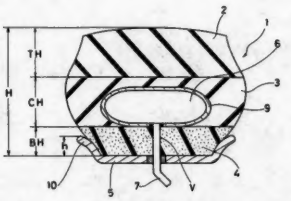
the section height of said middle layer being in the range of 20 to 50% of the tire section height,

the section height of said tread layer being in the range of 20 to 40% of the tire section height,

the hardness of the base layer being more than 75 JIS-A,

the hardness of the middle layer being in the range of 45 to 60 JIS-A and the impact resilience of the middle layer being more than 50%,

the hardness of the tread layer being in the range of 60 to 75 JIS-A,



said middle layer being provided with a circumferentially extending circular hollow part, and the volume of said circular hollow part being in the range of 30 to 60% of the whole volume of the middle layer.

4,877,072

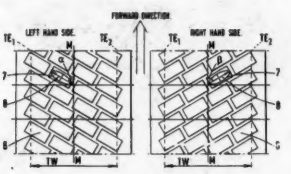
TREAD FOR LEFT AND RIGHT VEHICLE TIRES

Jean F. L. Fontaine, Bürden, Belgium, assignor to The Goodyear Tire & Rubber Company, Akron, Ohio

Filed Dec. 17, 1987, Ser. No. 134,333

Int. Cl.[4] B60C *11/11*

U.S. Cl. 152—209 R **6 Claims**



1. A vehicle comprising at least two steering wheels, each wheel having a pneumatic tire mounted thereon, each said tire having a ground engaging tread portion comprising a plurality of circumferentially extending arrays of substantially rectangular relief elements, as measured in a footprint of each said tire the ratio of the sum of the areas of the ground engaging surfaces of said substantially rectangular shaped relief elements to the total area of the ground engaging surface of said tread portion being greater than 50%, the treads of said tires having structures such that, using Cartesian axes wherein the center of the Cartesian axes of each said substantially rectangular relief element is located at its center of gravity and the x-axis being the axial direction of the tire and the y-axis being the circumferential direction of the tire, in a footprint of a tire mounted on a steering wheel on the left hand side of the vehicle said substantially rectangular shaped relief elements have central ellipses of inertia with the direction of their major axes being located in the second and fourth quadrants of their Cartesian axes and making an angle of between 45° and 80° with respect to the y-axis of said Cartesian axes, and in a footprint of a tire mounted on a steering wheel on the right hand side of the vehicle said substantially rectangular shaped relief elements have central ellipses of inertia with the direction of their major axes being located in the first and third quadrants of their Cartesian axes and making an angle of between 45° and 80° with respect to the y-axis of said Cartesian axes.

4,877,073

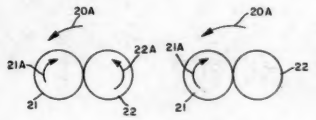
CABLES AND TIRES REINFORCED BY SAID CABLES

Marie R. Thise, Bras, Belgium, and Rene F. Reuter, Burden, Luxembourg, assignors to The Goodyear Tire & Rubber Company, Akron, Ohio

Filed Feb. 17, 1988, Ser. No. 156,677

Int. Cl.[4] D02G *3/48*; B60C *9/20*

U.S. Cl. 152—451 **17 Claims**



1. A nonmetallic cable comprising two yarns twisted together with one another, each of said yarns comprising a plurality of filaments, said cable being manufactured by the process consisting of the steps of imparting a yarn twist to each of said yarns such that before said yarns are twisted together with one another one of said yarns has a yarn twist that is at least twice as large as the yarn twist of the other yarn, said yarn twists being in opposite rotational directions from one another, and then twisting both of said yarns together with one another to form a cable having a cable twist that is opposite in rotational direction to the twist of the yarn having the larger of the two yarn twists, the resultant twist of said yarns in said cable differing from one another by a factor of at least two and said cable having an elongation of at least 4% when subjected to a force of 12 Newtons.

4,877,074

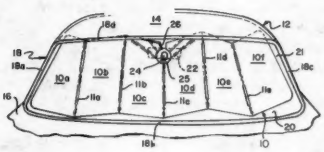
SUN SCREEN FOR VEHICLE

Anthony J. Castellano, Elmhurst, Ill., assignor to Century Container Corporation, Oak Brook, Ill.

Filed Feb. 6, 1989, Ser. No. 306,490

Int. Cl.[4] E06B *9/24*

U.S. Cl. 160—84.1 **22 Claims**



1. A sun screen for a windshield of a vehicle having a rearview mirror disposed adjacent to and aft of the windshield, said sun screen comprising:

a plurality of planar sections hingedly coupled together along adjacent edges thereof, wherein each of said planar sections is in the general form of a trapezoid tapered toward an upper edge thereof and wherein the sun screen may either be extended to a generally planar configuration or folded into a compact configuration;

engaging means disposed in an upper, center portion of the sun screen when extended and including an aperture coupled to an upper edge of the sun screen via an elongated linear slot, wherein said aperture is wider than said slot and is adapted for receiving and engaging a rearview mirror support element disposed adjacent to the windshield; and

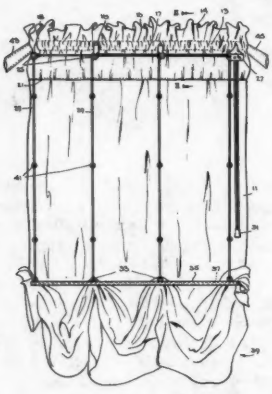
a flexible portion disposed about said aperture and adjacent to said slot to facilitate insertion of said mirror support into and its removal from said aperture.

4,877,075

WINDOW SHADE ASSEMBLY

Steven Markowitz, 719 Greenwich St., No. 2 South, New York, N.Y. 10014

Filed Mar. 6, 1984, Ser. No. 586,771
Int. Cl.[4] A47H 5/032
U.S. Cl. 160—84.1 6 Claims



1. An assembly for mounting a window shade on a curtain rod, said window shade having an upper end and a lower end substantially parallel thereto, comprising:

support means, having an elongate dimension extending substantially parallel and proximate to the upper end of the window shade, for engaging the curtain rod and cooperating therewith to support said window shade, said support means including at least one tubular formation on said window shade proximate to said upper end and extending substantially the entire width of said window shade in the direction of said elongate dimension, said tubular formation being provided with a plurality of apertures spaced along the length of said tubular formation, said curtain rod longitudinally traversing said tubular formation in an assembled state of the window shade mounting assembly;

a plurality of pulleys each provided with securing means insertable through said apertures and engageable with said curtain rod for removably attaching said pulleys thereto; and

tensile force transmission means operatively engaging said pulleys and attached to said window shade at the lower end thereof for alternately raising and lowering the lower end of said window shade in response to manipulations of said tensile force transmission means by an operator.

4,877,076

SCREEN UNIT WITH BUILT-IN BLIND

Akihiro Komori, Takamatsu, and Muneyoshi Hirano, Kurobe, both of Japan, assignors to Yoshida Kogyo K. K., Tokyo, Japan

Filed Aug. 11, 1988, Ser. No. 231,348
Claims priority, application Japan, Aug. 12, 1987, 62-124062[U]
Int. Cl.[4] E06B 3/32
U.S. Cl. 160—107 11 Claims

1. A screen unit with a built-in blind, comprising:

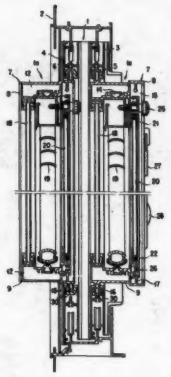
an existing sash;

a rectangular unit frame formed of an upper horizontal frame member, a lower horizontal frame member, a right vertical frame member and left vertical frame member;

an outdoor side glass panel fixedly mounted on the unit frame in the outdoor side of the same;

an indoor side glass panel member detachably mounted on the unit frame in the indoor side of the same;

a blind disposed between the outdoor side glass panel and the indoor side glass panel member; and



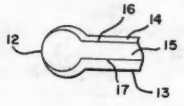
a flange formed integrally with the unit frame so as to extend along and project from the periphery of the unit frame, for engagement with a frame for an existing sash, said flange being fastened to a sacrifice frame fixed to said existing sash frame.

4,877,077

VERTICAL COEXTRUDED PEARLESCENT LOUVER FOR VERTICAL BLINDS

George W. Ebert, Chatsworth, Calif., assignor to Home Fashions, Inc., Santa Monica, Calif.

Filed May 13, 1988, Ser. No. 193,806
Int. Cl.[4] E06B 3/04
U.S. Cl. 160—236 23 Claims



1. A multilayer coextruded slat having upper and lower surfaces, first and second side edges, and first and second ends; having an opaque base layer comprising a first thermoplastic polymer, and a thin transparent pearlescent layer comprising a second thermoplastic polymer upon at least one surface of said opaque base layer; and having a coextruded fusion interface between said opaque base layer and said transparent pearlescent layer.

4,877,078

PATTERN FOR USE IN LOST PATTERN FOUNDRY PROCESS

Adalbert Wittmoser, 6840 Lampertheim, Fed. Rep. of Germany

Filed Jan. 26, 1989, Ser. No. 303,282
Claims priority, application Fed. Rep. of Germany, Jan. 30, 1988, 3802727; Jul. 4, 1988, 3822601
Int. Cl.[4] B22C 9/04
U.S. Cl. 164—34 10 Claims

1. In a method of manufacturing of metallic castings by using a vaporizable pattern of plastic foam to form a full mold for the

casting process, the improvement comprising the addition to said mold of an effective quantity of at least one organo metallic compound to reduce the formation of solid carbon during the vaporization of the plastic foam pattern.

4,877,079

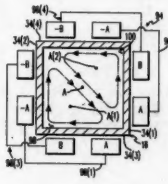
COUNTERFLOW ELECTROMAGNETIC STIRRING METHOD AND APPARATUS FOR CONTINUOUS CASTING

Lawrence J. Long, Crafton, and James A. Henrickson, Freedom, both of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Continuation of Ser. No. 107,436, Oct. 9, 1987, abandoned. This application Oct. 14, 1988, Ser. No. 258,069

Int. Cl.[4] B22D *27/02*

U.S. Cl. 164—468 **6 Claims**



1. A method of converting an electromagnetic stirring (EMS) apparatus from a rotary electromagnetic stirring (REMS) mode to a counterflow electromagnetic stirring (CEMS) mode, said converting method comprising the steps of:

(a) disconnecting a first arrangement of connections between a plurality of induction coils which establish the induction coils in a first predetermined phase relationship placing the apparatus in the REMS mode in which the coils generate a single rotating magnetic field capable of moving molten metal in a rotary stirring pattern; and

(b) reconnecting the induction coils in a second arrangement of connections therebetween to establish the induction coils in a second predetermined phase relationship which places the apparatus in the CEMS mode in which the coils generate a pair of counterrotating and colliding magnetic fields capable of moving molten metal in a pair of counterflow stirring patterns.

4,877,080

PROCESS AND APPARATUS FOR COOLING A FLUID

Rolf Ryham, Princeton, N.J., assignor to Ahlströmföretagen Svenska AB, Norrköping, Sweden

Filed Jun. 13, 1988, Ser. No. 206,036

Int. Cl.[4] B41C *3/02*; B22D *19/00*; F25B *15/00*

U.S. Cl. 165—2 **16 Claims**

1. A process for cooling a fluid comprising the steps of:

removing heat from a fluid by indirect contact with a liquid in a first heat exchanger;

expanding said liquid at reduced pressure so as to obtain vapor and remaining liquid;

condensing and absorbing said vapor in an absorption liquid having a lower vapor pressure than said vapor at a corresponding temperature;

removing heat from said absorption liquid; and

recirculating said remaining liquid to said heat exchanger.

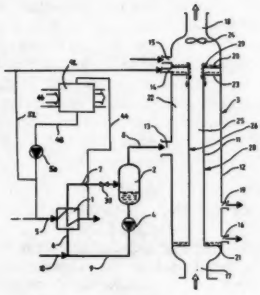
7. An apparatus for cooling a fluid comprising:

first means for transferring heat from said fluid to a liquid;

means connected to said first heat transferring means for releasing vapor by expansion from said liquid;

means connected to said vapor releasing means for condensing said vapor; said condensing means comprising second means for transferring heat having a first cooling surface for condensing and absorbing said vapor in an absorption liquid o said first cooling surface;

means for circulating said liquid through said vapor releasing means and said first heat transfer means; and



means for maintaining a reduced pressure in said vapor releasing means and over said cooling surface in said condensing means.

4,877,081

AIR-CONDITIONING APPARATUS FOR AUTOMOBILES

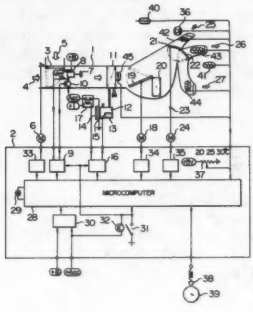
Eiichi Ohtsu, Katsuta, Japan, assignor to Hitachi, Ltd., Tokyo, Japan

Filed Mar. 20, 1989, Ser. No. 326,069

Claims priority, application Japan, Mar. 22, 1988, 63-67592; Mar. 22, 1988, 63-67593

Int. Cl.[4] F25B *29/00*

U.S. Cl. 165—30 **12 Claims**



1. An air-conditioning apparatus for automobiles, comprising:

means for sucking in air and guiding said air to an air blowdown outlet open to a cabin of an automobile;

means for cooling the air sucked in including a variable capacity compressor operatively connected in a refrigeration circuit;

means for heating the air sucked in;

first control means interposed between said cooling means and heating means for controlling the amount of the sucked in air proceeding to the heating means;

means for detecting the internal air temperature representing the interior of the cabin of an automobile;

means for detecting the atmospheric air temperature;

means for detecting the air blowdown temperature at said air blowdown outlet into the cabin;

means for setting a target value of said internal air temperature;

means for calculating a target value of the air blowdown temperature from the output signals of the internal air temperature detection means, the atmospheric air temperature detection means and the internal air temperature target value setting means;

means for calculating a compensation amount of the compressor capacity from the difference between the target air blowdown temperature and the output signal of the air blowdown temperature detection means; and

second control means for controlling the compressor capacity on the basis of the output of said calculation means.

4,877,082

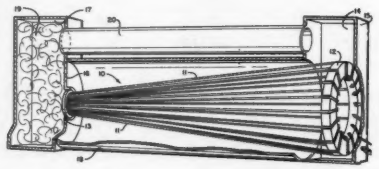
CONVERGENT STRAND ARRAY LIQUID PUMPING SYSTEM

Earl R. Collins, Jr., La Canada, Calif., assignor to United States of America as represented by the Administrator, National Aeronautics and Space Administration, Washington, D.C.

Filed Apr. 13, 1989, Ser. No. 337,767

Int. Cl.[4] F28D *15/02*

U.S. Cl. 165—104.26 **6 Claims**



1. A surface-tension liquid pumping system comprised of at least one array of taut converging strands spaced apart at one end adapted to receive liquid and gathered close together at the opposite ends of the strands to allow liquid wetting the strands to form menisci between adjacent strands where they approach convergence thereby to cause surface tension to force liquid wetting the strands to flow toward the converging ends of the strands.

4,877,083

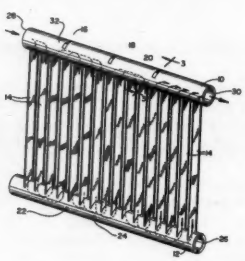
BRAZED HEAT EXCHANGER AND METHOD OF MAKING THE SAME

Z. Philip Saperstein, Lake Bluff, Ill., assignor to Modine Manufacturing Company, Racine, Wis.

Filed Jan. 9, 1989, Ser. No. 294,870

Int. Cl.[4] F28D *1/02*

U.S. Cl. 165—176 **15 Claims**



7. A heat exchanger comprising:

a pair of elongated spaced, parallel generally cylindrical headers;

a plurality of tubes extending between said headers and in fluid communication with the interior thereof;

slots in said headers generally transverse to the elongated dimension of said headers and extending at least about half way through the corresponding header;

baffles brazed in said slots, each baffle having an interior semicircular shaped peripheral section sized to embrace the interior wall of the corresponding header and an exterior, semicircular shaped peripheral section of larger radius than said interior section, and a notch in said exterior section of sufficient depth as to extend inwardly of said interior wall; and

braze metal filling at least that portion of said notch inwardly of said interior wall.

4,877,084

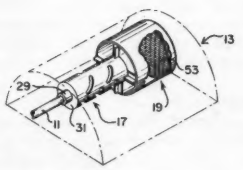
GAS WELL DISCHARGE VELOCITY DISSIPATOR

Philip E. Goggin, P.O. Box 4186, Marbleton, Wyo. 83113

Filed Nov. 14, 1988, Ser. No. 270,839

Int. Cl.[4] B05B *1/26, 1/20*

U.S. Cl. 166—75.1 **12 Claims**



1. Device for dissipating a high pressure stream of gas and liquid conducted for a well through a discharge line for release to atmospheric pressure, said device mounted at the end of said line and locatable in a liquid containment enclosure, said device comprising:

(a) open-bottomed hood mountable in said enclosure with the hood bottom spaced from the bottom of said enclosure and said hood having a front wall, an opposing rear wall and a downwardly sloped mid wall;

(b) conduit means mounted through said front wall and connected to said discharge line for discharging said stream towards the rear wall of said hood;

(c) first dissipator tube lying with its axis generally perpendicular to the rear wall of said hood and having a front wall connected to said conduit for conducting said stream into said first tube, the tubular wall of said first tube having a plurality of apertures therein and the diameter of said first tube being larger than the diameter of said conduit;

(d) first grate affixed within the rearward portion of said first tube and having a multitude of stream-passing apertures therein,

(e) second dissipator tube having a diameter significantly larger than the diameter of said first tube and mounted coaxially with said first tube with the open rear end of said first tube disposed at the open front end of said second tube, and the open rear end of said second tube spaced from and directly opposite the rear wall of said hood, and the wall of said second tube having a plurality of apertures therein; and

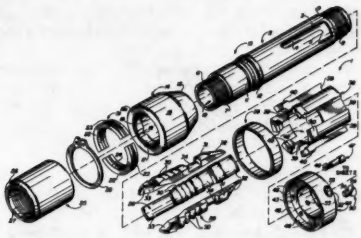
(f) second grate affixed within the rearward portion of said second tube, and having a multitude of stream-passing apertures therein.

4,877,085

MANUALLY OPERATED SPEAR APPARATUS

Joe G. Pullig, Jr., 104 Reeder Rd., Bossier City, La. 71112

Filed Dec. 27, 1988, Ser. No. 289,830
Int. Cl.[4] E21B *31/00*
U.S. Cl. 166—98 8 Claims



1. A manually operated spear apparatus for removing an object from a well bore, comprising an outer sleeve having three internal windows disposed in spaced relationship in said outer sleeve, said outer sleeve adapted for attachment to a string of wash-over pipe, wherein the outer sleeve and the wash-over pipe are supported in a well bore by a fishing string connected to the wash-over pipe, and a spear assembly adapted for disposition inside said outer sleeve and the wash-over pipe, said spear assembly further comprising a cylindrical mandrel provided with connecting means for removably connecting said cylindrical mandrel to the object; a slip cone carried by said cylindrical mandrel, said slip cone having a tapered body portion; a control lug housing carried by said cylindrical mandrel, bias means provided in said control lug housing and three control lugs disposed in spaced relationship in said control lug housing in alignment with said internal windows, respectively, said control lugs adapted for selectively engaging said windows in said outer sleeve and retaining said spear assembly in said outer sleeve in well insertion configuration, and disengaging said windows and releasing said spear assembly from said outer sleeve in operational configuration responsive to attachment of said spear assembly to the object in the well bore and rotation of the fishing string and lowering of the fishing string, the outer sleeve and the wash-over pipe in the well bore with respect to the spear assembly; a stabilizing bushing threadably carried by said cylindrical mandrel and said control lug housing and a keeper lug ring carried by said control lug housing and engaging said control lugs for maintaining said control lugs in said control lug housing; and further comprising a pair of J-slots provided in oppositely-disposed relationship in said cylindrical mandrel, said J-slots each having a first leg segment and a second leg segment connected to said first leg segment, a slip housing slidably mounted on said cylindrical mandrel, a plurality of slips seated in said slip housing and a pair of J-bolts disposed in said slip housing, said J-bolts adapted for selectively engaging said first leg segment and said second leg segment of said J-slots and retaining said slips in said slip housing in said well insertion configuration, and extending said slips in said slip housing responsive to rotation of the fishing string and raising of the fishing string in the well bore, in said operational configuration.

4,877,086

PRESSURE LIMITER FOR A DOWNHOLE PUMP AND TESTING APPARATUS

Gary D. Zunkel, Chickasha, Okla., assignor to Halliburton Company, Duncan, Okla.

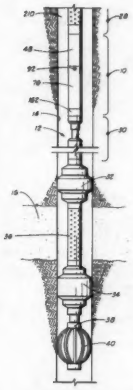
Filed Sep. 20, 1988, Ser. No. 247,122
Int. Cl.[4] E21B *34/06, 47/00*
U.S. Cl. 166—106 18 Claims

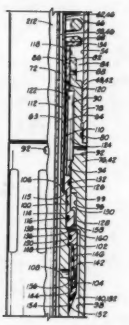
1. A pressure limiter for use in a tool string having a pump and an inflatable packer, said pressure limiter comprising:

housing means for positioning in said tool string between said pump and packer, said housing means defining a central opening therethrough and an outlet to the annulus of the well in communication with said central opening;

mandrel means for positioning in said central opening of said housing means;

port means on said housing means in communication with a discharge portion of said pump for providing a flow path in said housing means;





valve means disposed between said housing means and mandrel means for providing communication between said port means and said outlet when in an open position in response to an outlet pressure of said pump, said valve means further having a closed position; and

biasing means for biasing said valve means toward said closed position.

4,877,087

SEGMENTED FIN HEAT EXCHANGER CORE

David T. Hill, Granger, Ind., assignor to Sundstrand Heat Transfer, Inc., Dowagiac, Mich.

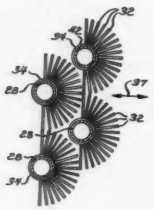
Filed Aug. 16, 1984, Ser. No. 641,476
Int. Cl.[4] F28F *1/20*
U.S. Cl. 165—181 11 Claims

1. A core for use in a heat exchanger comprising:

a tube of heat conductive material; and

a tape of heat conductive material wound a round said tube, said tape having a base extending completely about the periphery of the tube in abutment therewith to be in heat

transfer relation with the tube and a plurality of spines extending generally radially from said base in fanned relation over an arc length in the range of about 180°–220° in circumferential rows; the circumferential rows being aligned longitudinally of the tube along the length thereof such that said circumferential rows define an axial row of spines;



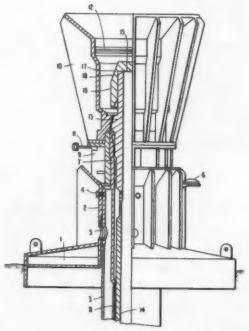
said tube being essentially free of said spines along a longitudinally extending area having an arc length in the range of approximately 180°–140 to thereby provide a heat exchanger having a heat transfer rate substantially equal to a heat exchanger having the spines extending over an arc length of 360°.

4,877,088

PROCESS AND EQUIPMENT FOR OIL WELL DRILLING AND COMPLETING OPERATIONS IN DEEP WATER

Renato S. Rodrigues, Niterói, and Jayme H. Ogura, Macaé, both of Brazil, assignors to Petroleo Brasileiro S.A. - Petrobras, Rio de Janeiro, Brazil

Filed Jan. 13, 1988, Ser. No. 143,535
Claims priority, application Brazil, Jan. 13, 1987, 8700104
Int. Cl.[4] E21B *7/128, 41/04*
U.S. Cl. 166—342 **3 Claims**



1. A process for oil well drilling and completing operations in deep water which allows an oil well drilled in deep water to start producing, said operations being conducted from a dynamically placed vessel, comprising;

(a) providing a permanent guide base (9) on the sea bottom containing a high pressure housing (13) having an upper free end (15) adapted to receive safety, drilling, and production (completion) equipment, the upper free end of the high pressure housing being covered by a protective cover (17) having an external conical part (18), said permanent guide base (9) also having attached thereto, by means of a releasing device, a releasable guide-funnel (10) which covers and protects the upper free end of the high pressure housing during drilling of the well but which prevents said production equipment from being installed because of its size and shape;

(b) withdrawing said releasable guide-funnel, after drilling operations are finished, by means of a remote control vehicle which activates said releasing device, thus leaving said protective cover exposed which, because of said conical part, is capable of performing the same guiding work as said guide-funnel after said guide-funnel has been removed; and

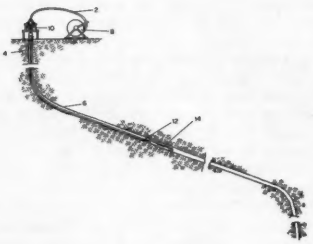
(c) lowering a production (completion) base (20) onto said permanent guide base (9) whereby said protective cover protects the upper free end of the high pressure housing from damage during said lowering step.

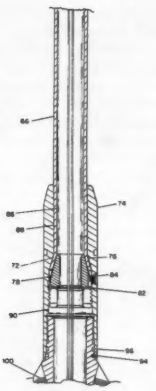
4,877,089

METHOD AND APPARATUS FOR COUPLING WIRELINE TOOLS TO COIL TUBING

Robert W. Burns, Richmond, Tex., assignor to Western Atlas International, Inc., Houston, Tex.

Filed Jun. 18, 1987, Ser. No. 63,420
Int. Cl.[4] E21B *47/00*
U.S. Cl. 166—377 **16 Claims**





14. A method for coupling a tool to a string of coil tubing disposed within a bore hole, comprising the steps of:

attaching an end of a lower housing to said tool;

attaching an end of an upper housing to said string of coil tubing; and

axially receiving an opposite end of said upper housing in an opposite end of said lower housing; and

detachably coupling said upper housing within said lower housing by way of an adjustable pressure fitting, com-

pressing the opposite end of said upper housing against the opposite end of said lower housing by a pressure applying means positioned within said lower housing.

15. A method for decoupling a tool from a string of coil tubing disoposed within a bore hole, comprisinig the steps of:

attaching a lower housing to said tool;

attaching an upper housing to said string of coil tubing; and

pressure coupling an end of said upper housing coaxially within said lower housing,

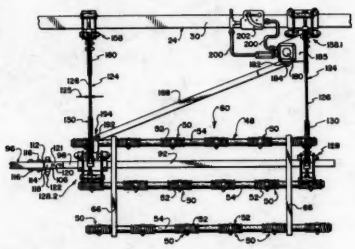
decoupling the tool from the coil tubing by applying a tension force to the coil tubing thereby deforming the end of said upper housing and allowing the upper housing to be withdrawn from the lower housing.

4,877,090

RECIPROCATING IMPLEMENT

Zan Gullickson, Barons, Canada, assignor to Keho Alta Industries Ltd., Barons, Canada

Filed Sep. 15, 1987, Ser. No. 97,561
Int. Cl.[4] A01B *19/06*
U.S. Cl. 172—102 **13 Claims**



1. A harrow, comprising:

a body having a front and a plurality of spaced apart tines;

means for transversely reciprocating the body;

means for supporting the harrow vertically and for permitting transverse reciprocation of the body, the means for supporting and for permitting transverse reciprocation cluding a plurality of spaced apart support members connected to the body, each of the support members being rigid in one direction to provide vertical support for the body and being flexible in a second direction, which is perpendicular to said one direction, to accommodate said transverse reciprocation, the support members including leaf springs extending from the front of the body and being spaced apart and parallel, the leaf springs being elongated and relatively broad in said one direction, which is vertical when the harrow is positioned for use, and relatively thin in said second direction which is transverse when the harrow is positioned for use, the leaf springs having front ends which are distal with respect to the body, the harrow further including a clamp at the front end of each of the leaf springs capable of securing the harrow to a cultivator.

4,877,091

AUGERING APPARATUS AND DRILLING RIG

Richard L. Howell, Jr., 6711 Park Ave., Garden Grove, Calif. 92645

Filed Jun. 27, 1988, Ser. No. 211,691
Int. Cl.[4] E21C *5/12*
U.S. Cl. 173—89 **32 Claims**

31. A downcrowdable telescopic augering apparatus for drilling a hole in the surface of the earth comprising:

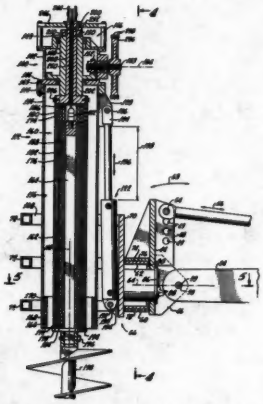
cradle means having a longitudinal central cavity;

housing means having a cylindrical inside surface which defines a torque axis, said longitudinal central cavity of said cradle means for receiving said housing means;

means for permitting slidable displacement of said housing means relative to said cradle means in, and restricted to, a predetermined straight line direction in axial alignment with said torque axis;

downcrowd means for downcrowding said housing means relative to said cradle means in said predetermined straight line direction;

torque transmission means rigidly attached to said reaction torque housing means, said torque transmission means adaptable for receiving torque from a source of rotary



power along an input power axis at an angle to said torque axis and transmitting torque in axial alignment with said torque axis;

telescopic kelly means having a plurality of telescoping kelly sections, said kelly means being rotatably mounted in said housing means for rotation about said torque axis thereof, said kelly means having a bottom part adaptable for coupling to an auger;

torque coupling means for transmitting torque from said torque transmission means to said kelly means; and

means for retracting said kelly means into said reaction torque housing means.

4,877,092

NEAR BIT OFFSET STABILIZER

Charles W. Helm, Rocky Hill, and Vernon E. Koval, Middletown, both of Conn., assignors to Teleco Oilfield Services Inc., Meriden, Conn.

Filed Apr. 15, 1988, Ser. No. 181,915
Int. Cl.[4] E21B *7/08*
U.S. Cl. 175—74 **43 Claims**

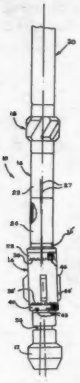
1. A bottomhole assembly including, a drilling motor, a bent sub upstream of the drilling motor and a drill bit downstream of the drilling motor, further comprising:

an offset stabilizer between said drilling motor and said drill bit, said offset stabilizer having a fixed degree of offset; and

means for orienting and locking said offset stabilizer in a pre-selected position in alignment with said bent sub while maintaining said fixed degree of offset wherein said orienting and locking means comprises;

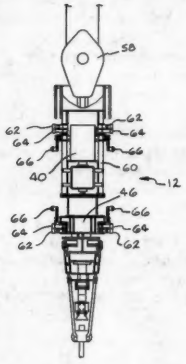
adapter ring means positioned between said stabilizer and said drilling motor, said adapter ring means having upper and lower opposed ends, said lower end including a plurality of radially arranged first slot means; and

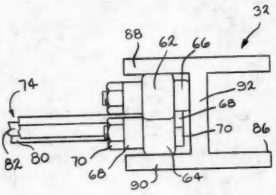
said stabilizer having opposed upper and lower ends, said upper end of said stabilizer including a plurality of radially



arranged second slot means, said first and second slot means being complimentary and mutually interlocking.

yieldably engages said flange and said roller on said second spring yieldably engages said web,





whereby said springs prevent free rotation of said power swivel around said longitudinal axis during rotation of said drill string by said power swivel.

4,877,093

SPRING ACTUATED POWER SWIVEL SUPPORT ROLLERS

David B. Ford, Frisco; James E. Lynch, Dallas, both of Tex., and Leroy R. Ratelke, Rockford, Ill., assignors to National-Oilwell, Houston, Tex.

Filed Mar. 3, 1988, Ser. No. 163,583

Int. Cl.[4] E21B *3/02*

U.S. Cl. 175—113 **11 Claims**

1. A combination, comprising:

a power swivel suspended for vertical movement within a derrick,

said power swivel including a drill motor for rotating a drill string into a well,

means for guiding said power swivel during said vertical movement along a track,

said track fixed to said derrick and disposed parallel to the longitudinal axis of said well,

said track including a flange and a web,

said guide means including first and second springs each having first and second ends,

said first ends being rigidly connected to said power swivel, each of said second ends having a roller journaled thereto, said springs preloaded so that said rollers on said first spring

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4,877,094

ROCK DRILLING MACHINE, ESPECIALLY FOR UNDERGROUND MINING

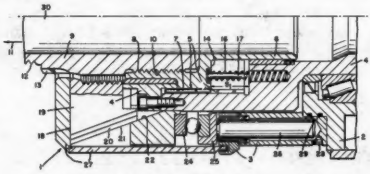
Wolfgang Ebeling, Hannover, Fed. Rep. of Germany, assignor to Turmag Turbo-Maschinen-Ag Nüsse & Gräfer, Sprockhövel, Fed. Rep. of Germany

Filed Jun. 3, 1988, Ser. No. 202,872

Claims priority, application Fed. Rep. of Germany, Jun. 4, 1987, 3718636

Int. Cl.[4] E21B *3/02*

U.S. Cl. 175—170 **27 Claims**



1. A rock drilling machine, particularly for underground excavations, comprising a drilling carriage; and a rotary drilling drive arranged in a longitudinally displaceable manner on said drilling carriage, said rotary drilling drive having a drive shaft; an adaptor connected with said drive shaft for joint rotation therewith and having a threaded end for form-locking receipt of drilling rods with a respective counter thread, and a

clamping head co-rotating with said drive shaft for force-transmitting receipt of outwardly smooth drilling rods, said adaptor being arranged forwardly of said clamping head as considered in a drilling direction, said threaded end of said adaptor extending outwardly beyond said clamping head for free observation and being releasably mounted on a part of said drive shaft independently of said clamping head.

4,877,095

STOPPER FOR CABLE PASSAGES OR CONDUITS

Christian Wittrisch, Rueil-Malmaison, France, assignor to Institut Francais du Petrole, Rueil-Malmaison, France

Filed Jun. 24, 1988, Ser. No. 211,258
Claims priority, application France, Jun. 25, 1987, 87 09007
Int. Cl.[4] E21B *17/00, 34/14*
U.S. Cl. 175—237 **18 Claims**

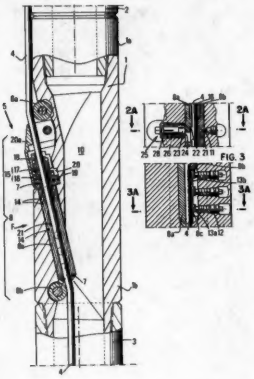


FIG. 3

1. A stopper for a cable passage conduit passing through a support which comprises a first chamber placed in the passage, said first chamber comprising at least one bearing surface located in said passage and adapted to cooperate with a closure element for closing said passage, a second chamber, located in a side wall of said conduit, having an opening adapted to communicate with the first chamber, said closure element being housed in the second chamber in a first position of the stopper relative to the support, and means for moving the closure element into the first chamber at a second position of the stopper relative to the support, where the cable is withdrawn from the passage, the stopper further comprising a separating member located between said first chamber and said second chamber, said separating member being adapted for controlling the movement of the closure element from the second chamber to the first chamber.

4,877,096

REPLACEABLE CUTTER USING INTERNAL DUCTILE METAL RECEPTACLES

Gordon A. Tibbitts, Salt Lake City, Utah, assignor to Eastman Christensen Company, Salt Lake City, Utah

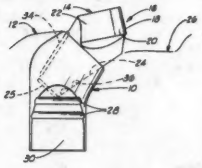
Continuation of Ser. No. 121,471, Nov. 17, 1987, abandoned.
This application Apr. 7, 1989, Ser. No. 336,643
Int. Cl.[4] E21B *10/46, 10/62*
U.S. Cl. 175—410 **12 Claims**

1. An improved matrix drag bit comprising:

a body defining a curved bit face thereon;

at least one ductile metal receptacle substantially disposed within said body and adapted to receive a replaceable cutter element, said receptacle including a first, leading end defining a receiving cavity and a second, trailing end extending from said first end at an angle thereto deeper into said body and comprising a progressively laterally narrowing, tapered root having first mechanical locking means associated therewith for permanently securing said receptacle within said body,

the length of the tapered root in cross section measured from the front to the back of the tapered root being greater than the thickness of the tapered root in cross section measured from side to side of the tapered root at least for a major portion thereof;



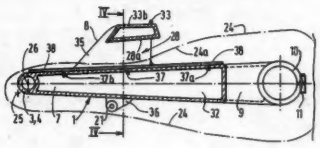
a replaceable cutter element comprising a cutting surface supported on a body portion disposed at least in part within said receiving cavity, whereby said cutting surface extends above said curved bit face, said body portion being temporarily secured within said receiving cavity by second mechanical locking means adjacent thereto adapted to prevent rotational movement of said cutting element within said receiving cavity.

4,877,097

SUPPORT AND SUSPENSION ARM FOR A DRIVING WHEEL

Daniel Trema, Bezons, France, assignor to Elf France, Courbevoie, France

Filed May 5, 1988, Ser. No. 190,956
Claims priority, application France, May 15, 1987, 87 06824
Int. Cl.[4] B62K *21/00, 25/00*
U.S. Cl. 180—357 **8 Claims**



1. Support and suspension arm for a driving wheel of a vehicle having a frame, the wheel mounted on one side of the arm and connected at least in rotation on the other side of the arm to a driving endless chain, the said arm being pivoted on the frame of the vehicle by an arm part which is disposed transversely to the moving direction of the vehicle, and is connected by at least two rotary bearings to the vehicle frame, wherein said arm has a region where it is subjected to a large flexion moment beyond the connection with an arm part thereof that is disposed transversely with respect to the frame

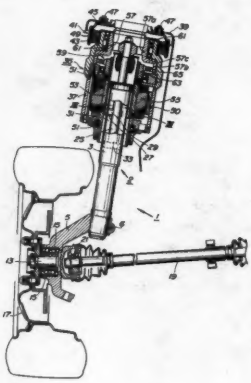
of the vehicle, and said arm has, in said region, an outer casing of the arm cross-section through which crosses at least one of the two strands of the chain in a chain channel, the walls of which cooperate for increasing the inertia moment of the arm section in the said region.

4,877,098

AUTOMATIC ROAD WHEEL STEERING SYSTEM

Nobuyoshi Asanuma, Saitama, Japan, assignor to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed May 13, 1988, Ser. No. 193,622
Claims priority, application Japan, May 13, 1987, 62-116476
Int. Cl.[4] B62D 5/04
U.S. Cl. 180—79.1 4 Claims



1. A system for automatically steering a road wheel, comprising:

a strut-type suspension including a cylinder, a piston rod having a longitudinal axis and reciprocable within the cylinder, and a piston attached to one end of the piston rod;

a wheel support member including a steering knuckle fixed to the cylinder and rotatably supporting the road wheel thereon;

first means for rotating said piston rod about its longitudinal axis, said first means being mounted to a vehicle body and operatively connected to the other end of said piston rod; and

second means for axially guiding said piston rod within said cylinder and operatively connecting the piston rod with the cylinder, so that rotary motion of the piston rod may be carried to the cylinder and the steering knuckle fixed thereto, thereby effecting steering of the road wheel.

4,877,099

ELECTRONICALLY CONTROLLED VARIABLE ASSIST POWER STEERING SYSTEM

James J. Duffy, Livonia, Mich., assignor to Ford Motor Company, Dearborn, Mich.

Continuation-in-part of Ser. No. 902,919, Sep. 2, 1986, Pat. No. 4,760,892. This application Jun. 17, 1988, Ser. No. 209,162
The portion of the term of this patent subsequent to Aug. 2, 2005, has been disclaimed.
Int. Cl.[4] B62D 5/08
U.S. Cl. 180—142 5 Claims

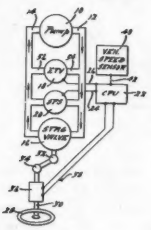
1. In a power steering system for an automotive vehicle having a tooth member adapted to be connected to a vehicle steering linkage, a driving member engageable with said gear tooth member, a driver controlled steering shaft and torsion bar connection between said steering shaft and said driving member whereby steering forces are distributed from said steering shaft to said gear tooth member;

a rotary valve assembly comprising a valve sleeve connected to and rotatable with said driving member, an inner valve element received in said valve sleeve and connected to and rotatable with said steering shaft;

a power steering pump, hydraulic pressure operated fluid motors having a pressure operated member connected to said gear tooth member whereby a fluid pressure force may be applied to said gear tooth member to supplement the manual steering effort, thereby providing the vehicle operator with a power assist;

a fluid pressure circuit connecting said pump to said fluid motor, said steering valve assembly being located in and defining in part said fluid pressure circuit whereby pressure is distributed to either one side of said fluid motor or the other depending upon the direction of torque applied to said steering shaft, said fluid pressure circuit comprising a high pressure passage connecting a high pressure side of said pump to the inlet side of said steering valve assembly and a low pressure return flow passage connecting the outlet side of said steering valve assembly with the inlet side of said pump;

an electronically controlled throttling valve located in parallel disposition in said fluid pressure circuit between the inlet side of said pump and the outlet side of said pump whereby a bypass flow path is established in parallel relationship with respect to the fluid flow path through said steering valve assembly;



an electronic central processor unit connected to said electronically controlled throttling valve, a steering torque sensor connected to said central processor unit, a steering pressure sensor in said hydraulic pressure circuit connected to said central processor unit;

a vehicle speed sensor connected to said central processor unit, said central processor unit having an electronic memory with stored vehicle speed, steering torque and steering pressure data, the relationship between said data indicating the optimum electrical voltage signal which when distributed to the electronically controlled throttle valve effects a controlled bypass of fluid from the high pressure side of said pump to the inlet side of said pump thereby effecting a controlled power assist that depends upon vehicle speed;

said electronically controlled throttling valve comprises a valve spool and a valve sleeve surrounding said valve spool, said sleeve and said spool being ported to effect controlled communication between the high pressure side of said pump and the low pressure side of said pump, and spring means for biasing said valve spool in one direction and a solenoid having windings surrounding an armature connected to said valve spool whereby displacement of said valve spool against the opposing force of said spring is dependent upon the output signal of said central processing unit, the magnitude of said output signal being determined by the magnitude of the vehicle speed sensor signal and the steering pressure sensor signal.

4,877,100
HYDRAULIC REACTION FORCE APPARATUS FOR POWER STEERING SYSTEM

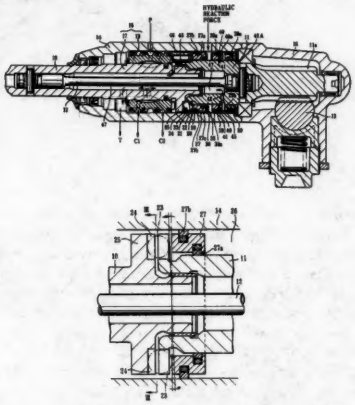
Yasuyoshi Emori; Hiroshi Ohsaki, and Ikuo Nomura, all of Higashimatsuyama, Japan, assignors to Jidosha Kiki Co., Ltd., Tokyo, Japan

Filed Aug. 12, 1988, Ser. No. 231,808

Claims priority, application Japan, Sep. 16, 1987, 62-139995[U]; Sep. 16, 1987, 62-139996[U]; Sep. 16, 1987, 62-139997; Sep. 30, 1987, 62-150198[U]; Sep. 30, 1987, 62-150199[U]

Int. Cl.[4] B62D *5/083*

U.S. Cl. 180—143 **9 Claims**



1. A hydraulic reaction force apparatus for a power steering system, comprising:

a body;

input and output shafts accommodated in said body, each shaft having an outer surface;

a flange formed on one of said input and output shafts and having a plurality of axially extending guide holes;

a plurality of balls movably fitted in said guide holes, respectively;

a reaction force receiving portion, formed on the other one of said input and output shafts, for axially receiving said balls;

a hydraulic reaction force chamber formed at a position opposite to said reaction force receiving portion with respect to said flange;

an annular reaction force piston, movably and coaxially fitted on said output shaft with a clearance, for urging said balls against said reaction force receiving portion to generate a restriction force corresponding to a reaction force oil pressure, the restriction force acting between said input and output shafts; and

a plurality of seal rings one of said seal rings being disposed between said reaction force piston and said body and another of said seal rings being disposed between said reaction force piston and said one of said input and output shafts.

4,877,101
CONSTANT-SPEED CONTROL DEVICE FOR A VEHICLE

Tetsuya Tada, Anjo; Masumi Nagasaka, Toyota; Tatsuo Teratani, Aichi; Akira Miyazaki, and Junji Takahashi, both of Kobe, all of Japan, assignors to Toyota Jidosha Kabushiki Kaisha and Fujitsu Ten Limited, both of, Japan

Filed Nov. 16, 1987, Ser. No. 120,930

Claims priority, application Japan, Nov. 26, 1986, 61-279618

Int. Cl.[4] B60K *31/08*

U.S. Cl. 180—177 **7 Claims**

1. A constant-speed control device for a vehicle, said device controlling a throttle valve provided in an intake passage of an internal combustion engine so that said vehicle runs at a constant speed set by a driver, said device comprising:

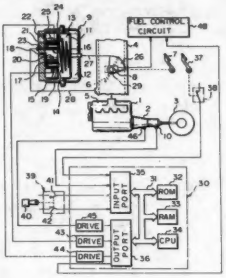
an actuator controlling the degree of opening of said throttle valve;

means for controlling said actuator in accordance with the vehicle speed to obtain constant-speed control;

means for sensing the degree of opening of said throttle valve;

means for supplying fuel to said engine;

means for preventing a fuel supply by said fuel supply means when the degree of opening of said throttle valve is smaller than a predetermined value; and



means for suspending operation of said fuel supply prevention means in relation to a difference between the vehicle speed and a driver set constant-speed control target speed, during control of said actuator to obtain constant-speed control, whereby sudden increases and decreases in the vehicle speed about the constant speed-control target speed are reduced.

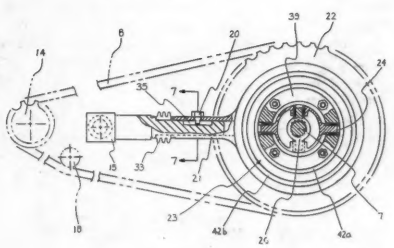
4,877,102
MULTI-WHEELED VEHICLE SUSPENSION AND DRIVE MECHANISM

Jeff Stewart, 1531 N. Drexel Rd., #74, West Palm Beach, Fla. 33417

Filed Jul. 5, 1988, Ser. No. 215,253

Int. Cl.[4] B62D *61/06*; B62K *5/02*

U.S. Cl. 180—217 **9 Claims**



1. A suspension and drive mechanism for a vehicle having two or more laterally mounted driven wheels, comprising:

a. an axle housing which rotatably supports a driven axle;

b. an axle housing support which is attached to the vehicle body;

c. said axle housing being supported by said axle housing support such that said vehicle body is pivotable about the vehicle longitudinal axis relative to said axle housing;

d. a driven member to which rotational energy is transmitted from a driving member, said driving member being: connected to said vehicle body; rotatable about a transverse axis; and, offset from the vehicle longitudinal axis;

e. a means for supporting said driven member relative to said vehicle body such that: the plane of rotation of said driven member is essentially coplanar with the plane of rotation of said driving member; and, said driven member is translatable in an essentially vertical direction; and,

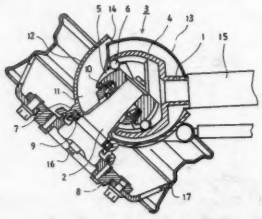
f. a coupling means which connects said driven member to said driven axle such that rotational energy is transmitted to said driven axle over a range of relative angles between the axes of rotation of said driven member and said driven axle, said coupling means being translatable along said driven axle.

4,877,103

POWER TRANSMISSION APPARATUS

Erkki Nuutio, Tampere, Finland, assignor to Autojoukko OY, Finland

Filed Mar. 21, 1988, Ser. No. 170,761
Claims priority, application Finland, Mar. 19, 1987, 871218
Int. Cl.[4] B60K *17/30*
U.S. Cl. 180—259 **20 Claims**



1. Apparatus for power transmission, in which power is transmitted from a driving shaft to a driven shaft through a joint having an outer section coupled to said driving shaft and an inner section coupled to said driven shaft which is rotatably supported in a frame surrounding the same,

said inner and outer sections being turnable with respect to one another, and

said frame including a generally cylindrical part in which said driven shaft is rotatably supported and an at least partially substantially spherical section extending out from said cylindrical part and surrounding said driven shaft, wherein

said inner section of said joint is coupled to said driven shaft such that an inner end of said frame cylindrical part towards said joint is at least partially situated within a movement range of said outer section of said joint when said driving shaft and said driven shaft are turned out of axial alignment and at an angle with respect to one another, and

at least one notch is provided in said frame cylindrical part and arranged such that said outer section of said joint at least partially penetrates thereinto when said driven shaft and driving shaft are turned by a sufficiently large angle with respect to one another.

4,877,104

BRAKING SYSTEM FOR A MOTORIZED DUMPING VEHICLE

Donald R. Morrison, 6228 Eagle Park Dr., Charlotte, N.C. 28214

Filed Feb. 3, 1988, Ser. No. 151,973
Int. Cl.[4] B60K *17/14*
U.S. Cl. 180—308 **3 Claims**

1. A hydraulic braking system, comprising:

(a) a hydraulic fluid source;

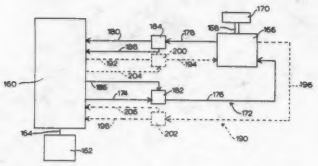
(b) a hydraulic fluid flow circuit coupled to said hydraulic fluid source for flow of hydraulic fluid therethrough;

(c) an anti-cavitation valve, a hydraulic motor, and a pressure relief valve disposed in said flow circuit, in series relationship with one another, and with said hydraulic motor disposed in said circuit between said ant-cavitation valve and said pressure relief valve;

(d) a branch conduit joining said hydraulic fluid source with said anti-cavitation valve;

(e) a second branch conduit joining said hydraulic fluid source with said pressure relief valve;

(f) means for selectively flowing hydraulic fluid through said flow circuit and said anti-cavitation valve, said hydraulic motor, and said pressure relief valve in sequence, and for terminating the flow of hydraulic fluid from said hydraulic fluid source through said flow circuit; and



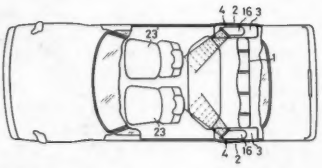
(g) a second hydraulic fluid flow circuit having disposed therein in series relationship a second anti-cavitation valve, and a second pressure relief valve, said hydraulic motor being disposed in said second hydraulic fluid flow circuit between said second anti-cavitation valve and said second pressure relief valve, whereby said hydraulic motor may be selectively driven in opposite directions by hydraulic fluid flow through a selected one of said first and second flow circuits, and with means for selectively flowing said hydraulic fluid from said hydraulic fluid source through a selected one of said first and second flow circuits.

4,877,105

REAR SPEAKER UNIT FOR A MOTOR VEHICLE

Norio Mugikura, Wako, Japan, assignor to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Sep. 7, 1988, Ser. No. 241,730
Claims priority, application Japan, Sep. 8, 1987, 62-136195[U]
Int. Cl.[4] H05K *5/00*
U.S. Cl. 181—141 **5 Claims**



1. A rear speaker unit for a motor vehicle, comprising:

a speaker box located at a rear side portion of a passenger compartment of said vehicle to extend in a longitudinal direction of a vehicle body of said vehicle, said speaker box being provided with an opening at a front end of said speaker box and having a front end portion which is bent toward a center of said passenger compartment; and

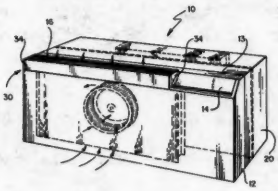
a speaker mounted in said opening of said speaker box.

4,877,106

SOUND-ATTENUATING DISCHARGE APPARATUS FOR A PACKAGED TERMINAL AIR CONDITIONER

Donald G. Neville, Syracuse; David A. Giordano, East Syracuse, and Mark R. Hogan, Manlius, all of N.Y., assignors to Carrier Corporation, Syracuse, N.Y.

Filed Apr. 29, 1988, Ser. No. 187,688
Int. Cl.[4] E04F 17/04
U.S. Cl. 181—224 9 Claims



1. In a unit having a fan for moving air to be conditioned through the unit and a discharge opening sloping downward from a top of the unit covered by a removable grille for discharging conditioned air to a space containing the unit, a silencer for attenuating noise generated by the fan comprising:

a vertically projecting assembly adapted to be connected to the sloped discharge opening in place of said grille and defining a flow path for the conditioned air discharged to the space containing the unit, said assembly including a generally vertical front wall and two generally vertical side walls connected to said front wall, said assembly having means attached to at least one said wall for securing said assembly to the unit, and

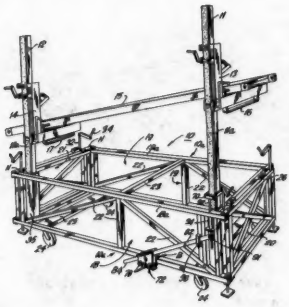
a sound attenuating material layer means adapted to be connected to an inside surface of said walls for absorbing sound.

4,877,107

MOBILE SCAFFOLDING SYSTEM AND SCAFFOLD SUPPORT

Carl Anderson, c/o Alum-A-Pole Corporation 2589 Richmond Ter., Staten Island, N.Y. 10303

Filed Jul. 5, 1988, Ser. No. 215,256
Int. Cl.[4] E04G 1/20, 1/24
U.S. Cl. 182—17 46 Claims



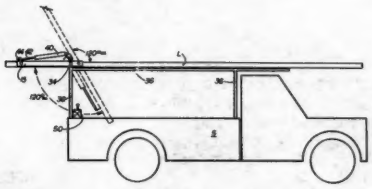
1. A movable scaffolding system comprising a scaffold support having rolling means depending from the bottom thereof, a pair of pump jack poles, means on said support for supporting said poles in a vertical free-standing manner on said support on which can ride a pair of pump jacks respectively mounted on said poles supporting a scaffold staging extending between the pump jacks, and extensible means secured to said support surface for stabilizing and restraining motion of said scaffolding, said extensible means comprising said means for supporting said poles in a vertical manner and being responsive to a weight applied to the scaffold staging.

4,877,108

HYDRAULIC LADDER BRACE

Lamar H. Griffin, 3737 Northview La., Dallas, Tex. 75229, and Paul Hutchins, 15707 Wingale, Houston, Tex. 77082

Filed Oct. 11, 1988, Ser. No. 255,389
Int. Cl.[4] E06C 5/06
U.S. Cl. 182—68 10 Claims



1. A hydraulically operated ladder brace for transporting, for deploying and for supporting a standard, mobile extension ladder which ladder brace is pivotally attachable to a separate member carried at the rear of the vehicle, said ladder brace comprising:

two elongated structural members, each member having a distal end and a proximal end, said structural members being arranged substantially in parallel relationship one with the other and connected one to the other by at least one cross piece;

pivot means attached to each of said elongated structural members;

a hydraulically operated ram and cylinder device having one end pivotally connected to said cross piece and an opposite end capable of being connected with said separate member associated with a rack mounted on the rear portion of a vehicle; and

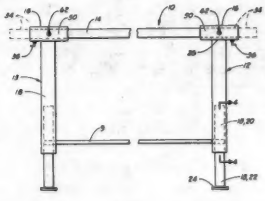
fastening means positioned to secure said mobile extension ladder in parallel relationship with said two elongated structural members.

4,877,109

ADJUSTABLE SAWHORSE AND SCAFFOLD

Donald G. Welch, P.O. Box 1040, Hooker, Okla. 73945, and Randall N. Barton, 1402 N. Quinn, Guymon, Okla. 73942

Filed Sep. 28, 1988, Ser. No. 250,221
Int. Cl.[4] B27B 21/00; B25H 1/06
U.S. Cl. 182—183 28 Claims



1. A sawhorse apparatus comprising:

a pair of end supports, each end support comprising:

a longitudinally extending tubular member; and

a plurality of legs attached to said tubular member and extending downwardly therefrom;

a horizontal member disposed through said tubular members of said end supports and having a portion extending longitudinally inwardly between said tubular members; and

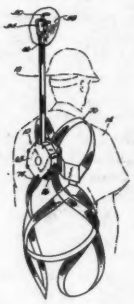
clamping means on each of said tubular members for clamping said horizontal member thereto, each clamping means being positioned on the corresponding tubular member at a position longitudinally outwardly of said legs.

4,877,110

SAFETY DEVICE WITH RETRACTABLE LIFELINE

J. Thomas Wolner, Red Wing, Minn., assignor to D B Industries, Inc., Red Wing, Minn.

Filed Oct. 14, 1988, Ser. No. 257,599
Int. Cl.[4] A62B *1/10*
U.S. Cl. 182—232 12 Claims



1. A safety device for restraining a person who works at great heights, said device comprising

a housing adapted to be connected to one of the person and a restraint,

a drum rotatably mounted and contained within said housing and including

a first drum flange,

a spaced generally parallel second drum flange having a braking surface generally perpendicular to the axis of drum rotation, and

a cylinder centrally connected between said first drum flange and said second drum flange,

a lifeline having a first end attached to said drum cylinder, and a second end extending outside said housing and adapted to be connected to the other of the person and the restraint, said lifeline being wound around said drum cylinder in response to said drum being rotated in a retracting direction, and said lifeline being unwound from around said drum cylinder in response to said drum being rotated in an opposite extending direction,

means for biasing said drum to rotate in said retracting direction, and

means for braking extending rotation of said drum at an angular velocity in excess of some predetermined speed, said braking means comprising

a disk assembly in braking pressure contact with said drum brake surface, and

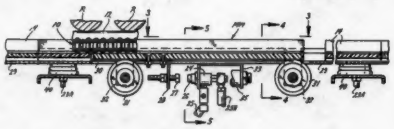
means for fixing said disk assembly to said housing in response to the predetermined speed.

4,877,111

CHAIN LUBRICATOR

John J. Kilper, St. Louis County, Mo., assignor to Alvey, Inc., St. Louis County, Mo.

Filed Aug. 19, 1988, Ser. No. 233,813
Int. Cl.[4] F16N *1/00*
U.S. Cl. 184—15.1 7 Claims



1. An endless chain drive with lubrication supply control; comprising:

(a) an endless chain having a tension run and a non-tension run;

(b) motor driven means to drive said endless chain;

(c) friction sensing means mounted adjacent said endless chain in position to engage with and move in response to a predetermined value of the friction developed by the engagement therewith;

(d) a source of lubrication connected to normally closed valve means, the opening of said valve being capable of dispensing lubricant onto said chain; and

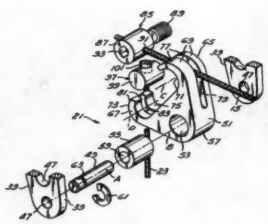
(e) control means responsive to the operation of said motor means to said endless chain and also responsive to the movement of said friction sensing means responsive to said predetermined value in the friction between said chain and said movable friction sensing means for opening said valve means and effecting the dispensing of lubricant onto said chain whereby the dispensed lubricant reduces the friction value below said predetermined value of the friction and said control means allows said normally closed valve means to close and discontinue dispensing lubricant.

4,877,112

BICYCLE BRAKE CABLE ASSEMBLY

Roger A. Malinowski, Newport Beach, Calif., assignor to Malcom Smith Products, Riverside, Calif.

Filed Sep. 19, 1988, Ser. No. 246,428
Int. Cl.[4] B62L *3/02*
U.S. Cl. 188—24.22 4 Claims



1. A bicycle brake cable assembly, comprising:

a stem, comprising:

a substantially vertical shaft;

an elongate arm extending substantially horizontally outward from said shaft; and

a clamp secured to the end of said arm opposite said shaft for securing and supporting a pair of handlebars;

a housing extending from said shaft or said arm, said housing including a pair of sides horizontally spaced from one another;

a pin, at least a portion of which is secured between the sides of said housing defining an axis of rotation;

a device mounted on and rotatable about said pin, said device comprising:

a generally triangular body including a horizontal bore having a diameter larger than the diameter of said pin, through which said pin extends;

a first fork extending from said body for retaining a brake cable connected to a brake lever, said first fork including a pair of curved prongs, wherein the space between the prongs of said first fork forms a vertical slot and one side of said prongs of said first fork forms a partial cylindrical surface; and

a second fork spaced from said first fork extending from said body for retaining a brake cable connected to a brake caliper, said second fork including a pair of curved prongs, wherein the space between the prongs of said second fork forms a vertical slot, the side of said prongs of said second fork facing said first fork forms a partial cylindrical surface, and the ratio between the perpendicular distance between said axis of rotation and the axis of the partial cylindrical surface formed by said prongs of said first fork and the perpendicular distance between said axis of rotation and the axis of the partial cylindrical surface formed by said prongs of said second fork is between 7 to 6 and 3 to 2.

4,877,113

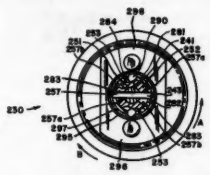
ONE-WAY CLUTCH PREVENTING BACK DRIVE OF REVERSIBLE MOTOR

Alistair G. Taig, Edwardsburg, Mich., assignor to Allied-Signal Inc., Morristown, N.J.

Division of Ser. No. 183,129, Apr. 19, 1988, Pat. No. 4,836,338. This application Jan. 18, 1989, Ser. No. 298,604

Int. Cl.[4] F16D *55/16*

U.S. Cl. 188—82.84 **9 Claims**



1. A one-way clutch mechanism which prevents the back drive of a reversible motor, comprising a drive shaft having a drive pin extending transversely therefrom, the drive shaft and drive pin disposed within a drive member, the drive member having therein a pair of oppositely disposed radially extending drive slots, the drive pin extending radially through said drive slots and for engaging and rotating the drive member in one direction of rotation, the drive member having cam surfaces about the periphery thereof receiving bearing means thereat, a cage member disposed about said drive member and having oppositely disposed radial cage slots, the drive pin extending radially into said radial cage slots, the radial cage slots being in circumferential nonalignment with said drive slots, and a housing disposed about said cage member and having an interior surface engaged by said bearing means, so that rotation in an opposite direction of the drive pin by the drive shaft results in the drive pin engaging and rotating the cage member to release the bearing means from engagement between the interior surface and cam surfaces before the drive pin engages and rotates the drive member in the opposite direction.

4,877,114

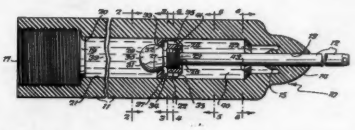
ADJUSTABLE FLUID AMPLIFIED SHOCK ABSORBER

Paul H. Taylor, Grand Island, N.Y., assignor to Tayco Developments, Inc., North Tonawanda, N.Y.

Filed Jul. 19, 1988, Ser. No. 221,477

Int. Cl.[4] F16F *9/34*

U.S. Cl. 188—285 **25 Claims**



1. An adjustable fluid amplified shock absorber comprising a casing, compressible fluid in said casing, a piston rod slidable in said casing, a chamber within said casing, a piston head, mounting means mounting said piston head on said piston rod within said chamber, channel means operatively associated with said piston head and having an unrestricted smooth entry portion for receiving said compressible fluid and providing fluid amplified flow, and means for adjusting the size of said channel means to thereby vary the level at which said fluid amplified flow occurs.

4,877,115

PISTON FOR A PISTON-CYLINDER UNIT

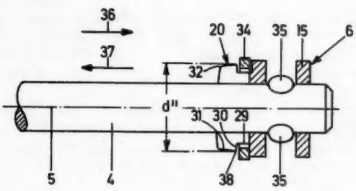
Hans-Peter Bauer, and Hans J. Bauer, both of Altdorf, Fed. Rep. of Germany, assignors to Fritz Bauer and Sohne OHG, Altdorf, Fed. Rep. of Germany

Filed Jul. 15, 1988, Ser. No. 219,750

Claims priority, application Fed. Rep. of Germany, Jul. 29, 1987, 3725101

Int. Cl.[4] F16F *9/34*; F16J *1/06*

U.S. Cl. 188—322.15 **9 Claims**

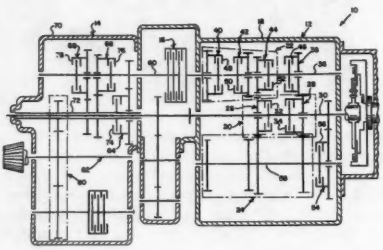


1. A piston for a piston-cylinder unit, comprising a substantially cylindrical housing (1) having two ends (2, 3) and being filled with a pressurized fluid, and closed at one end (2) and in which there is displaceably guided a piston rod (4) which emerges in sealed manner from the other end (3) of the said housing (1), the piston rod (4) carrying the piston (6) on a portion of an end which is located in the interior (10) of the housing (1), the piston (6) comprising a piston ring groove (26) in which there is disposed a piston ring (34) which comes to bear against side walls (27, 30) of the groove (26), wherein a portion (20) of the piston (6) which extends at least from the piston ring groove (26) to a free end (22) consists of a plurality of segments (23) separated from one another by longitudinal slots (24) and wherein this portion (20) is provided with a bore (21) the diameter (di') of which is at the free end (22) smaller than the diameter (d') of a portion of the piston rod (4) which carries the segments (23).

4,877,116
HYDRAULIC CONTROL SYSTEM FOR A TRACTOR TRANSMISSION

Joachim Horsch, Lombard, Ill., assignor to J. I. Case Company, Racine, Wis.

Filed Jun. 30, 1988, Ser. No. 213,364
Int. Cl.[4] B60K 41/22
U.S. Cl. 192—3.57 41 Claims



1. A control system for a transmission which is shiftable from a neutral condition into either forward or reverse conditions as selected by a positionable shift lever, said transmission having speed and range transmission assemblies which are selectively coupled by a fluid actuated master clutch, said speed transmission assembly comprising interconnected input and output sections, said input section including alternatively operated drive clutch assemblies for developing at least two different input speed ratios, said output section including at least three clutch operated forward drive gears and a clutch operated reverse drive gear, said range transmission assembly including at least three different clutch operated range assemblies, said control system comprising:

a valve body connected to a source of pressurized fluid;

first operative means arranged in combination with said valve body for directing pressurized fluid to the alternatively operated drive clutch assemblies of the speed transmission assembly input section;

second operative means arranged in combination with said valve body for selectively directing pressurized fluid to one of said three clutch operated forward drive gears of the speed transmission assembly output section;

third operative means arranged in combination with said valve body for selectively directing pressurized fluid to one of said clutch operated range assemblies of the range transmission assembly; and

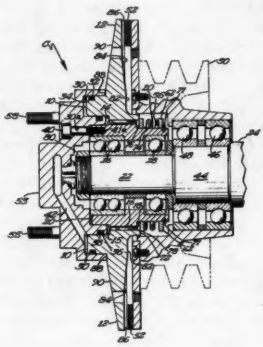
fourth operative means arranged in combination within the valve body for directing pressurized fluid to the first, second and third operative means and to the clutch operated reverse drive gear as a function of the position of the shift lever.

4,877,117
ROTATIONAL CONTROL APPARATUS

Charles J. Kniebel, Plymouth; Virgil Schieffer, White Bear Lake, and Robert C. Bredt, Minneapolis, all of Minn., assignors to Horton Industries, Inc., Minneapolis, Minn.

Filed Aug. 24, 1988, Ser. No. 235,960
Int. Cl.[4] F16D 3/14
U.S. Cl. 192—85 A 21 Claims

1. In a rotational control apparatus including a friction disc portion slidably mounted on and rotationally related to a hub rotatably mounted on a shaft, with the friction disc being biased on the hub by a spring engaging a retainer on the hub, with the improvement comprising an improved hub comprising a radially outermost portion and a radially reduced portion, with a shoulder being defined by and between the radially outermost portion and the radially reduced portion, with the friction disc portion being slidably mounted on and rotationally related to the radially outermost portion of the hub; a washer slidably mounted on the radially reduced portion of the hub, with the spring being sandwiched between the washer and the retainer of the hub, with the washer abutting with the friction disc portion in the assembled apparatus and with the

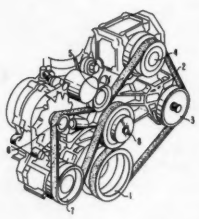


friction disc portion being slidable from the hub when disassembling the apparatus without requiring removal of the hub from the shaft, with the washer abutting with the shoulder of the hub for retaining the spring in a compressed condition on the hub.

4,877,118
SLIP DETECTING DEVICE FOR APPARATUS DRIVEN BY A PRIME MOVER

Yasuji Tamura, Ojima, Japan, assignor to Sanden Corporation, Gunma, Japan

Continuation of Ser. No. 732,289, May 9, 1985, abandoned. This application Nov. 12, 1987, Ser. No. 122,635
Claims priority, application Japan, May 9, 1984, 59-91043
The portion of the term of this patent subsequent to Sep. 29, 2004, has been disclaimed.
Int. Cl.[4] F16D 27/16, 43/00
U.S. Cl. 192—103 R 15 Claims



1. In an apparatus driven by a prime mover, a device for providing a slippage signal when slippage is present in the power transfer mechanism used to connect siad apparatus to said prime mover, said device comprising:

speed detecting means for detecting the rotational speed of said apparatus and providing a speed signal corresponding to said speed;

reference signal means for providing a reference speed signal which corresponds to a speed less than the idling speed of said prime mover;

a comparator means for receiving said speed signal and said reference speed signal, wherein said comparator means

provides said slippage signal when said speed signal is less than said reference speed signal, wherein said speed detecting means provides a plurality of voltage pulses, the period between each of said voltage pulses being dependent on the rotational speed of said apparatus; and

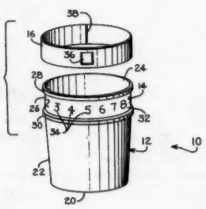
waveform-shaping means coupled to said detecting means by coupling means for shaping the waveform of said voltage pulses to a standard width while maintaining the original period between said voltage pulses, wherein said waveform-shaping means comprises first and second logic NOR gates coupled in cascade, wherein a first input of said first NOR gate receives said voltage pulses and a second input of said first NOR gate is coupled to the output of said second NOR gate, the output of said first NOR gate being coupled to a first input of said second NOR gate by coupling means formed of a capacitor/resistor network and a second input of said second NOR gate being coupled to a logic zero.

4,877,119

DRINKING-BEAKER ASSEMBLY

Jeannette T. Hosking, 2927 N. 73rd St., Kansas City, Kans. 66109

Filed Mar. 21, 1989, Ser. No. 326,379
Int. Cl.[4] B65D *25/20*
U.S. Cl. 206—459 **10 Claims**



1. A drinking-beaker assembly for use in the consumption of desired amounts of potable liquid within a predetermined time period by a user, the assembly comprising:

a beaker presenting a substantially horizontal base, an upright wall structure extending upwardly therefrom, upper portions of said wall structure defining a wide-mouthed, open top, certain portions of said wall defining an annular groove on the exterior of said wall structure, including an upper rib and a lower rib, said ribs being substantially parallel and extending substantially radially from the exterior of said wall structure, said groove further presenting a bight connecting said ribs;

use-indicia means, including portions adjacent said bight, for sequentially indicating the number of consumptive uses of said assembly by said user within a predetermined time period; and

an opaque resilient, annular, split-ring collar, complementally configured with said groove and snugly disposed therein, said collar being axially rotatable relative to said beaker along and within said groove, and certain portions of said collar forming a window, cooperatively aligned with said use-indicia means, for selectively exclusively displaying portions of said use-indicia means having a sequentially appropriate number,

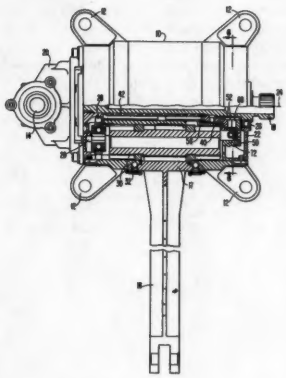
thus allowing the user, with each consumptive use to rotate said collar with respect to said beaker sufficiently to align said window with portions of said use-indicia means having the sequentially appropriate number associated with such consumptive use and thereby exclusively displaying the total number of consumptive uses of said assembly.

4,877,120

ACTUATOR MECHANISM HAVING ADJUSTABLE STOP

John D. Tysver, and Duane Grimm, both of Rockford, Ill., assignors to Sunstrand Corp., Rockford, Ill.

Filed Mar. 8, 1988, Ser. No. 165,607
Int. Cl.[4] F16D *71/00*
U.S. Cl. 192—141 **15 Claims**



1. A mechanism containing an adjustable mechanical stop to provide protection against overtravel of a rotatable main shaft having a longitudinal axis comprising:

a housing for supporting said main shaft for rotation about said shaft axis;

a wheel mounted in said housing and having fixed stops thereon at a plurality of spaced positions radially outwardly of said main shaft;

means mounted to said housing and drivingly connected to the wheel to control the position of said wheel for adjustably controlling the angular position of said wheel and fixed stops about said main shaft;

a member including stop members mounted for rotation with said main shaft and for translation along said main shaft between a running position where the stop members do not contact the fixed stops and a locking position where the stop members are engaged with said fixed stops;

biasing means for normally maintaining said stop members in said running position; and

means responsive to a predetermined number of revolutions of the main shaft as measured from an index position for causing said stop members to translate in a direction along the main shaft axis against the bias force of said biasing means from said running position into said locking position.

4,877,121

VERTICAL EXCURSION ACCOMMODATION APPARATUS

Yoshikazu Yamashita, and Toshiharu Ikenaga, both of Yokohama, Japan, assignors to Okamura Corporation, Japan

Filed Oct. 20, 1987, Ser. No. 110,687
Claims priority, application Japan, Oct. 30, 1986, 61-256955; Mar. 31, 1987, 62-78769
Int. Cl.[4] B65G *17/18*
U.S. Cl. 198—475.1 **3 Claims**

1. A vertical excursion accommodation apparatus comprising a plurality of excursion shelf units disposed side by side and control means for driving said excursion shelf units independently, each of said excursion shelf units comprising:

at least one tray;

a first driven shaft and a first driving shaft disposed horizon-

tally and parallel with respect to each other and having sprockets mounted thereon;

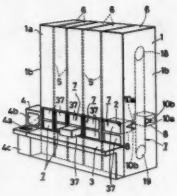
a first endless chain passing around said sprockets;

first and second arms for supporting each of said trays, said first support arm including a pair of first links, said first links having first ends pivotably coupled to said first endless chain, said first ends being spaced a distance apart in a vertical direction, said first links having free ends pivotably connected to a first pin on one side wall of said tray;

a second driven shaft and a second driving shaft disposed horizontally and parallel with respect to each other and having sprockets mounted thereon;

a second endless chain passing around said sprockets of said second driven and driving shafts;

said second support arm including a pair of second links, said second links having first ends pivotably coupled to said



second endless chain, said first ends of said second links being spaced a distance apart in a vertical direction, said second links having free ends pivotably connected to a second pin on the other side wall of said tray,

said first pin is provided at a position on said one side wall and said second pin is provided at a position on said other side wall of said tray so that said tray will always be held horizontally;

guide rails having an oval side view;

guide arms, each of said trays having a first guide arm connected to said one side wall and a second guide arm connected to said other side wall, each of said guide arms having a free end thereof guided by one of said guide rails; and

said control means for adjustably controlling said trays moving around said horizontal shafts along an oval orbit by rotating said sprockets.

4,877,122

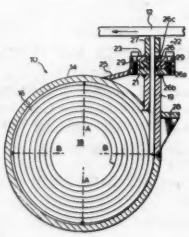
CONVEYOR BELT SCRAPERS

Normand Morin, P.O. Box 636, 80 Nickel Street, Levack, Ontario, Canada (P0M 2C0)

Filed May 2, 1988, Ser. No. 189,239

Int. Cl.[4] B65G *45/00*

U.S. Cl. 198—499 **20 Claims**



1. Apparatus for removing particulate material from a conveyor belt, comprising:

(a) a flexible wear element for bearing against the working surface of a moving conveyor belt and for removing particulate material therefrom;

(b) a housing shaped and dimensioned for dispensing one end of the wear element against the conveyor belt and for storing the rest of the wear element in the interior of the housing, the transverse dimensions of the interior of the housing being less than the length of the wear element;

(c) wherein the housing is pressure-tight up to a given operating pressure when the wear element is within the housing; and

(d) wherein the housing is adapted to be filled by a fluid which when compressed acts directly on the wear element within the housing to force the wear element against the conveyor belt and to maintain the wear element against the conveyor belt as the wear element wears.

4,877,123

CONVEYOR MEANS FOR WAFERS

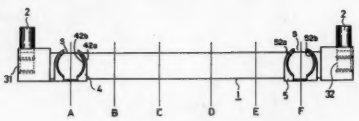
Ichiro Fukuwatari, and Seiji Watanabe, both c/o Hitachi Kiden Kogyo, Ltd., 1-go 11-ban, 3-chome, Shimosakabe, Amagasaki, Hyogo, Japan

Filed Mar. 10, 1988, Ser. No. 166,308

Claims priority, application Japan, Nov. 2, 1987, 62-278016

Int. Cl.[4] B65G *35/00*

U.S. Cl. 198—619 **1 Claim**



1. A conveyor means for transporting wafers, comprising:

an elongated wafer carrying vehicle-transporting course;

at least one wafer carrying vehicle movable along said transporting course, said vehicle having a generally C-shaped cross-section when viewed in side elevation, an upper arm having an upwardly open recess for receiving a wafer to be transported, a vertical arm from the upper end of which said upper arm extends, and a lower arm extending from the lower end of said vertical arm, said upper arm and said vertical arm having a transverse slot therethrough;

permanent magnets on the under surface of said lower arm and magnetic fluid interposed between said lower magnets and said transporting course; and

a moving means for moving the vehicle along the transporting course, whereby the vehicle is caused to float by the magnetic fluid above the transporting course and is caused to move along the transporting course so as to transport the wafers therealong.

4,877,124

CONVEYOR SYSTEM AND METHOD FOR TRANSPORTING MATERIALS

Murrell T. Miller, Portland, Oreg., assignor to ACRAVAC, Portland, Oreg.

Division of Ser. No. 947,041, Dec. 29, 1986, Pat. No. 4,766,994.

This application May 25, 1988, Ser. No. 198,513

Int. Cl.[4] B65G *17/36*

U.S. Cl. 198—711 **16 Claims**

1. A conveyor system for transporting materials which comprises:

a plurality of continuous cables which are disposed generally parallel one to the other;

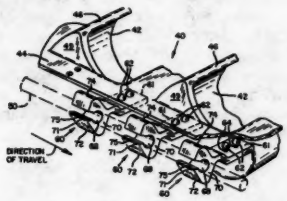
a continuous conveyor belt, disposed between said continuous cables, which includes a plurality of unitary, open top, pocket-like receptacles for transporting said materials;

flat planar portions located between, and joined to, adjacent pocket-like receptacles;

a plurality of connectors for connecting said continuous cables to said conveyor belt; and

a plurality of drive means for driving said continuous conveyor belt; and

said receptacles including a smooth, continuous concave surface, located so that they extend above and below the



plane of travel of said continuous cables whereby said materials can be transported within the confines of said receptacles in both a horizontal path of travel and a vertical path of travel, respectively, until said materials are conveyed to the point of travel where they are discharged from the conveyor system for further subsequent processing.

4,877,125

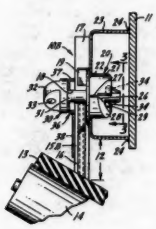
CONVEYOR SKIRTBOARD MOUNTING ASSEMBLY

James R. Gordon, Benton, Ill., assignor to Gordon Belt Scrapers, Inc., Benton, Ill.

Filed Jul. 21, 1988, Ser. No. 222,021

Int. Cl.[4] B65G *21/20*

U.S. Cl. 198—836 **15 Claims**



1. A mounting assembly for a belt conveyor installation including a wall positioned a short gap distance above a conveyor belt and a replaceable skirtboard member extending downwardly from the wall to close the gap between the wall and the belt, the mounting assembly comprising:

a cam member having a key aperture extending therethrough, at least one keyway projecting radially from the key aperture, a cam ramp starting at a low point on one end of the cam member, adjacent the keyway, and extending arcuately away from that point, and key latching means located at the end of the cam ramp farthest from the keyway;

means for mounting the cam member on the wall with the key aperture approximately normal to the wall;

a key comprising a shaft, a head substantially larger than the cam member key aperture on one end of the shaft, and a key element projecting radially from the other end of the shaft;

the dimensions and configuration of the cam member and the key being complementary to each other so that the key element and shaft of the key may be inserted through the key aperture and keyway of the cam member with the key shaft fitting closely in the aperture;

the key being rotated relative to the cam member to move the key element along the cam ramp into engagement with the key latching means so that the key head firmly clamps a skirtboard member onto the wall.

4,877,126

CONVEYOR BELT

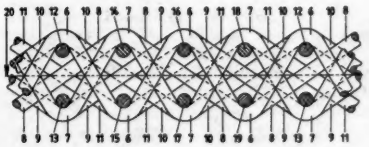
Freerk R. van Calker, Lathum; Pieter J. M. Kopmels, Wehl, and Antonius W. M. Ter Burg, Arnhem, all of Netherlands, assignors to Akzo nv, Arnhem, Netherlands

Filed Jun. 2, 1988, Ser. No. 203,739

Claims priority, application Netherlands, Jun. 4, 1987, 8701305

Int. Cl.[4] B65G *15/34*

U.S. Cl. 198—847 **9 Claims**



1. A conveyor belt formed by a matrix, more particularly based on rubber, such as polychloroprene rubber, in which there is at least provided a layer of woven reinforcing fabric extending parallel to the bearing surface and the tread of the conveyor belt, of which reinforcing fabric the warp extending in longitudinal direction of the conveyor belt comprises both load bearing yarns, cords or cables consisting of polyester and load bearing yarns, cords or cables consisting of aramid, wherein the load bearing aramid warp yarns, cords or cables in the reinforcing fabric display a greater yarn-in-fabric take up than the load bearing polyester yarns, cords or cables.

4,877,127

FRAME FOR BAND CONVEYING DEVICES

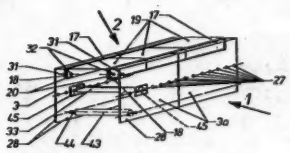
Helmut Geppert, Niederfeld 12, D-5162 Niederzier-Krauthausen, Fed. Rep. of Germany

Continuation of Ser. No. 803,410, Nov. 13, 1985, abandoned. This application Jun. 20, 1988, Ser. No. 210,178

Claims priority, application Fed. Rep. of Germany, Mar. 13, 1984, 3409160

Int. Cl.[4] B65G *21/00*

U.S. Cl. 198—860.3 **11 Claims**



1. A frame for a band conveying device comprising:

a pair of adjacent longitudinal beams, each longitudinal beam being an inverted U-shape beam including a to web which is the base of the U-shape, a side web forming one leg of the U-shape and a connection flange forming the other leg of the U-shape, wherein said connection flange is of vertical extent relatively shorter than that of said side web, and wherein said connection flanges of said pair of

longitudinal beams are positioned between said side webs of said longitudinal beams;

a skid plate, said skid plate being an inverted U-shape piece, said skid plate including a central web which is the base of the U-shape and a pair of side webs which are the legs of the U-shape, and having said pair of side webs substantially parallel to said connection flange of each longitudinal beam, wherein said central web and said top webs of said pair of longitudinal beams are in the same plane;

a cross beam separate from and located below and spaced from said skid plate, said cross beam adapted to connect and hold together said side webs of said pair of adjacent longitudinal beams, said cross beam having an extent in the direction of movement of the band of said conveying device substantially less than the respective extent of said skid plate; and

means for connecting said cross beam to each of said side webs of said pair of adjacent longitudinal beams.

4,877,128

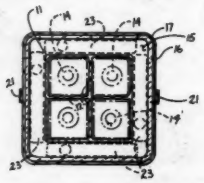
BABY BOTTLE CADDY

Joyce M. Strickland, 100 West St., #103, Vernon, Conn. 06066

Filed Nov. 21, 1988, Ser. No. 274,364

Int. Cl.[4] B65D *71/00, 81/18*

U.S. Cl. 206—170 **10 Claims**



1. A bottle caddy comprising,

a first interior continuous wall integrally formed to a first floor portion, and

a plurality of crossed partition walls integrally formed interiorly of a cavity defined by the interior wall and the first floor portion to define a plurality of compartments, and

a second cup-shaped wall portion including an integrally formed second floor portion and a second vertical wall wherein said first floor portion is integrally secured to an upper surface of said second floor portion, and

said second wall is spaced from said first interior wall to define a continuous gap therebetween, and

a third cup-shaped wall portion including a hingedly mounted cover flap integrally secured to an exterior surface of said second wall portion, and

a plurality of bottles receivable within said compartments to provide rigidity to said caddy.

4,877,129

RECLOSABLE SELF-OPENING CAN END

Robert A. Wells, 107 N. Lakeside Dr., Kennesaw, Ga. 30144

Division of Ser. No. 207,141, Jun. 15, 1988. This application Apr. 14, 1989, Ser. No. 338,989

Int. Cl.[4] B65D *41/32*

U.S. Cl. 220—269 **3 Claims**

1. Selectably reclosable easy-opening apparatus for a container, comprising:

a container wall;

a selectably openable panel defined in said wall at least in part by a selectably separable region of predetermined weakness formed in the container wall;

an opening and reclosure member pivotably attached to said wall and having a hinge connection permitting selectable movement of said member on a first path substantially normal to the container wall, said pivotabe attachment allowing the opening member to undergo movement on said second path substantially parallel to the container wall;

said opening member having a finger portion overlying at least a portion of said openable panel in position to apply force downwardly against the openable panel in response to movement of the opening member about said hinge connection along said first path, thereby separating said separable region and displacing said panel downwardly relative to said wall, so that an opening is formed in said wall by separation and displacement of said panel;

said opening member having a lift portion with an apeture formed therin;

a separate reclosure member being inserted and fastened within said aperture of said lift portion;

said lift portion and said separately attached reclosure member confronting the container wall at a location displaced from said openable panel while said finger portion overlies at least a portion of said openable panel; and

said sepaarately attached reclosure member being located on the opening member in relation to said pivotable attachment so as to be selectably registable with said opening by pivoting said opening member on said second path after said opeining is formed;

so that the container may be opened by hinging the opening member on said first path, and thereafter may be reclosed by pivoting said lift portion with said inserted and fastened separate reclosure member on said second path and urging said reclosure member into removable engagement with the container wall adjacent said opening therein.

4,877,130

TAMPER-PROOF JACKET-BOX ASSEMBLY FOR LOAN OR SALE

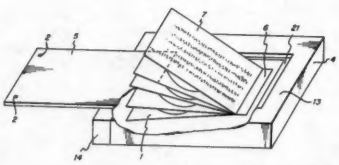
Louis Matuz, 24 rue Bizet, Saint Michel sur Orge, 91240, France

Filed Jun. 6, 1988, Ser. No. 202,324

Claims priority, application France, Jun. 24, 1987, 87 08886; Sep. 30, 1987, 87 13503

Int. Cl.[4] B65D *85/57*

U.S. Cl. 206—309 **9 Claims**



1. A tamper-proof box assembly adapted for storing compact discs, comprising:

a compact disc jacket assembly having at least two sleeves, a first of said sleeves adapted to hold an information card and a second of said sleeves adapted to hold a compact disc;

box means for enclosing at least the second of said sleeves therein;

a sliding cover for closing and opening said box means;

lock means disposed between said box means and said sliding cover for locking the sliding cover to close the box means, said locking means incorporating a metal locking strip between the box means and the sliding cover.

4,877,131

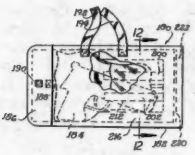
FIREARM RECOVERY BAG

Spiro Patros, 13034 S. Buffalo, Chicago, Ill. 60633, and Dominic C. Vimarco, 2929 W. 102nd Pl., Chicago, Ill. 60642

Filed Apr. 29, 1988, Ser. No. 187,742

Int. Cl.[4] B65D *85/00*; F41C *27/00*

U.S. Cl. 206—317 **20 Claims**



1. A containment apparatus for the safe recovery and transport of a firearm having a barrel and loaded with a cartridge, the cartridge loaded with a shot and an explosive for projecting the shot through the barrel of the firearm in a preselected direction, the apparatus comprising:

a body of flexible ballistic material forming an enclosure defining an opening through which the firearm is inserted for entry into the body, the body having at least a pair of sidewalls and a bottom portion generally opposite the opening;

a cover of flexible ballistic material overlying substantially the entire body opening so as to cooperate with the body to completely enclose the firearm and any shot discharge therefrom, the cover having a free end overlying the enclosure;

a releasable fastener for releasably securing the cover free end to the body, and openable to relieve gas pressure generated within said body by the explosive, after the shot contained within the body has been stopped by at least one of the body and cover; and

a stop member within the body adjacent the bottom portion thereof covering the bottom of the body and extending at least partly over said sidewalls, for at least one of said significant dissipation of the kinetic energy of the shot and said deflecting of the shot away from the bottom portion; and

said bottom portion and said sidewalls cooperating to restrain movement of said stop member when impacted by the shot.

4,877,132

SYRINGE PROTECTION DEVICE

Luke Makris, 7455 Ridge Blvd., Chicago, Ill. 60645, and George Dimopoulos, 916 Cumberland, Park Ridge, Ill. 60068

Filed Mar. 20, 1989, Ser. No. 326,099

Int. Cl.[4] B65D *85/00*

U.S. Cl. 206—364 **17 Claims**

1. A container for use with a syringe, having a body with two end portions one end portion adapted for fitting a needle and the other adapted for slidingly encompassing a plunger, the plunger having a syringe engagement end and a surface end, the syringe body having finger grip means, the improvement comprising;

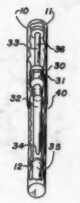
first tube means having a terminal end, an engagement end and interior and exterior surfaces;

second tube means having a terminal end, an engagement end and interior and exterior surfaces;

said first tube engagement end having finger grip engagement slots defined by elongate legs extending from said tube and engagement surface means disposed between said legs; and

said legs having second tube engagement means;

said second engagement end having first tube engagement



means corresponding to the engagement means on the first tube and having a finger grip engagement surface;

where said tubes may be engaged in telescoping relationship; and

where said syringe is inserted in said container and said first tube engagement surfaces and second tube engagement surface bear against said syringe finger grips and are maintained in said bearing relation by the compression of the respective tube engagement means.

4,877,133

END WALL OF MOLDABLE MATERIAL FOR A WOUND ROLL

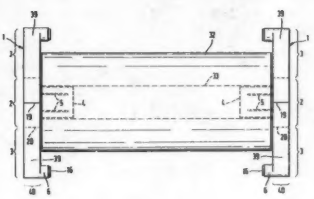
Otto Klenter, Much, and Klaus Burk, Overath-Vilkerath, both of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

Filed Mar. 8, 1989, Ser. No. 320,714

Claims priority, application Fed. Rep. of Germany, Mar. 11, 1988, 3808065

Int. Cl.[4] B05D *61/00*

U.S. Cl. 206—416 **16 Claims**

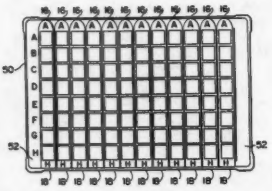


1. An end wall of moldable material for a wound roll comprising a central wall body and a plurality of outer wall parts adjacently contacting the circumferential surface of said central wall body, wherein said central wall body and outer wall parts form a rectangular plate comprising a front side facing said roll, a rear side facing outward, and a plurality of rounded corner surfaces, wherein said front side comprises a smooth flat surface, a central insertion plug and a plurality of locking bosses, and said rear side comprises a plurality of radial and annular ribs, whereby said rear side is stiffened.

4,877,134
TEST TUBE CASSETTE SYSTEM AND CASSETTES FOR USE THEREIN

David C. Klein, 20 Redding Ridge Dr., Gaithersburg, Md. 20878

Filed Mar. 29, 1988, Ser. No. 174,855
Int. Cl.[4] B65D *85/62*
U.S. Cl. 206—443 9 Claims



1. A test tube cassette system comprising a rack, at least eight test tube cassettes and means for precisely positioning said cassettes on said rack;

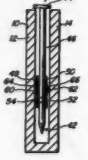
each said cassette comprising a plurality of substantial identical test tubes, each said test tube having a pair of parallel planar surfaces, each said cassette further comprising a pair of opposed end side walls, a pair of coplanar protrusions, each one of said pair of coplanar protrusions extending traversely from one of said end side walls and including a rack contacting surface, said cassette further comprising positioning means located proximate each of said pair of coplanar protrusions;

said rack comprising a frame-like rectangular upper support surface, a rectangular opening formed in said upper support surface and four legs extending from the corners of said rectangular support surfaces, said upper support surface further comprising two parallel support edges for supporting the coplanar protrusions of at least eight cassettes, positioning means located proximate said support edges for cooperating with the positioning means of at least eight cassettes for precisely positioning said at least eight cassettes with respect to one another.

4,877,135
COLLATED NAIL STRIP

William L. Gabriel, 78 Lakeview Pkwy., Barrington, Ill. 60010, and Reinhold Meditz, 1136 Stanton Rd., Lake Zurich, Ill. 60047

Filed Sep. 26, 1988, Ser. No. 248,724
Int. Cl.[4] B65D *85/24*
U.S. Cl. 206—344 8 Claims



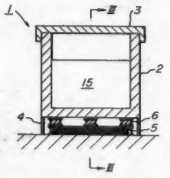
1. For use in a nail-feeding magazine, which is adapted to feed a standard strip of collated nails, the nails of the standard strip having cylindrical shanks of a uniform diameter and being collated by at least one pair of tapes, each tape of each pair of tapes of the standard strip extending across the shanks of the nails of the standard strip and being adhered to a respective one of diametrically opposed areas on the shank of each nail of the standard strip, the standard strip having an overall width, as measured at each pair of tapes of the standard strip, which width is selected so as to enable the nail-feeding mechanism to feed the standard strip without allowing the shanks of the nails of the standard strip to wobble excessively:

a substitute strip of collated nails having cylindrical shanks of a uniform diameter smaller than the diameter of the shanks of the nails of the standard strip and being collated by at least one pair of tapes, each tape of each pair of tapes of the substitute strip extending across the shanks of the nails of the substitute strip and being adhered by an adhesive layer to a respective one of diametrically opposed areas on the shank of each nail of the substitute strip, at least one tape of at least one such pair of such tapes of the substitute strip having an outer rib extending along such tape, the outer rib constituting means for compensating for the shanks of the nails of the substitute strip being of a smaller diameter than the shanks of the nails of the standard strip, and for causing the overall width of the substitute strip, as measured at the outer rib of each such pair of tapes of the substitute strip, to be approximately equal to the overall width of the standard strip, which lacks such a rib, so as to enable the nail-feeding magazine to feed the substitute strip without allowing the shanks of the nails of the substitute strip to wobble excessively.

4,877,136
VIBRATION FREE CONTAINER FOR TRANSPORTATION

Keiichiro Mizuno, Tokyo, and Kazuyoshi Iida, Yokohama, both of Japan, assignors to Bridgestone Corporation, Tokyo, Japan

Filed Apr. 18, 1988, Ser. No. 182,706
Claims priority, application Japan, Apr. 17, 1987, 62-93295; May 1, 1987, 106249
Int. Cl.[4] B65D *81/02*
U.S. Cl. 206—521 16 Claims



1. A vibration free container for transportation comprising: a container, and vibration isolating means arranged under said container and comprising first and second vibration isolating devices disposed one on top of another, said first vibration isolating device eliminating vibration only in a vertical direction, and said second vibration isolating device comprising laminated rubber bodies for eliminating vibration only in a horizontal direction.

4,877,137
DISPLAY PACKAGE MODULE FOR PROMOTIONAL DISPLAY USE

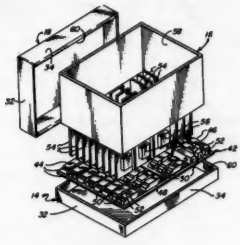
James A. Govang, Killingworth, and Mark E. Goldstein, Farmington, both of Conn., assignors to The Stanley Works, New Britain, Conn.

Filed Mar. 5, 1987, Ser. No. 21,986
Int. Cl.[4] B65D *19/38*
U.S. Cl. 206—597 9 Claims

1. A display package module comprising a box; a product stand within said box; and a multiplicity of product units within said box on said product stand; said box including a base component and a sidewall component removably assembled therewith and extending upwardly about the periphery of said base component to define an internal cavity within which said product stand and product units are disposed, said base component comprising a base panel element with a flange element

extending upwardly about the periphery thereof, said sidewall component comprising a unitary shell substantially conforming in cross section to said base panel element and seated within the recess defined by said flange element in close proximity thereto; said product stand being unitary and seated upon and supported by said base panel element of said base component, said product stand being substantially disposed within said base panel element so as to be substantially enclosed thereby, said product stand providing a multiplicity of upwardly extending recesses, and said product units being individually engaged and stably supported in said recesses of said stand to extend upwardly beyond said base component within said cavity, whereby removal of said sidewall component will expose said product units for display upon said base component, said product units extending above said flange element and said product stand for display thereon upon removal of said sidewall component.

9. An integrated assembly of package modules, comprising: a skid having an upper, normally horizontal support surface, a plurality of rectangular pallets arranged in side-by-side relationship upon said support surface, a multiplicity of package modules arranged as a plurality of stacks upon said pallets, each of said stacks comprising a multiplicity of vertically disposed package modules, horizontally adjacent package modules being elements of different stacks; first means extending vertically along all four sides of the modules and engaged with the modules of a stack and with all four side of its associated pallet for separately securing each of said stacks of modules to the associated one of said pallets to provide a plurality of independent subassemblies separately removable from said skid with said first means substantially intact; and second means engaged with and securing all of said subassembly to said skid to provide said integrated assembly, said second means being disengagable from said subassemblies without injury to said first means, said subassemblies of said pallets and modules lying substantially within the peripheral of said skid support surface; said pallets having support surface which are dimensioned and configured to cumulatively occupy substantially the same area as said skid support surface; each of said package modules comprising: a box, a product stand within said box, and a multiplicity of product units within said box on said product stand, said box including a base component and a sidewall component removably assembled therewith and extending upwardly about the periphery of said product stand and product units are disposed, said base component comprising a base panel element with a flange element extending upwardly about the periphery thereof, said sidewall component comprising a unitary shell substantially conforming in cross section to said base panel element and seated within the recess defined by said flange element in close proximity thereto, said product stand being unitary and seated upon and supported by said base panel element of said base component, said product stand being substantially disposed within said base panel element so as to be substantially enclose thereby, said product stand providing a multiplicity of upwardly extending recesses and said product units being individually engaged and stably supported in said recesses of said stand to extend upwardly beyond said base component within said cavity, whereby removal of said sidewall component will expose said product units for display upon said base component, said product units extending above said flange element and said product stand for display thereof upon removal of said sidewall component.

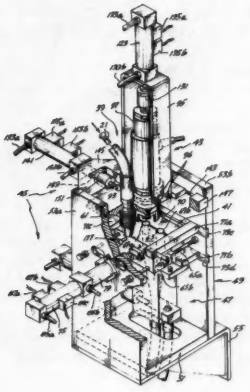


4,877,138

FASTENER HEAD ELEVATION MEASURING APPARATUS

Mohammad I. Motiwala, Everett, Wash., assignor to The Boeing Company, Seattle, Wash.

Filed Jul. 27, 1987, Ser. No. 78,257
Int. Cl.[4] B07C 5/04
U.S. Cl. 209—601 **15 Claims**



1. A fastener head elevation measuring apparatus comprising:

a gauge block having an upper surface and at least one vertically oriented, precisely sized hole opening into said upper surface, said hole being sized to receive a shank of a headed fastener;

a fastener delivery mechanism for delivering head fasteners, each having a countersunk head and a shank, said fastener delivery mechanism having an outlet located above said gauge block for delivering said headed fasteners, shank down, to said vertically oriented, precisely sized hole;

a head elevation measuring instrument located above said gauge block and spaced from the outlet of said fastener delivery mechanism for measuring the elevation of the headed fastener above the upper surface of said gauge block after said fastener delivery system has delivered the headed fastener to said vertically oriented, precisely sized hole;

alignment means coupled to said gauge block for selectively aligning said vertically oriented, precisely sized hole with the outlet of said fastener delivery mechanism and said head elevation measuring instrument; and,

a discharge mechanism for discharging measured fasteners from said vertically oriented, precisely sized hole in said gauge block.

11. A fastener head elevation measuring apparatus as claimed in claim **10** wherein said discharge mechanism includes directing means for directing dropped measured fasteners to one or the other of two outlet tubes.

4,877,139

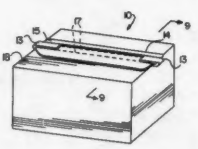
CONTAINER WITH AN OPENING DEVICE COMPRISING A GUIDE STRIP AND TEAR BAND

Myun H. Kim, 37-57 80th St. 190 D37, Jackson Heights, N.Y. 11372

Continuation-in-part of Ser. No. 947,806, Dec. 30, 1986. This application Apr. 29, 1988, Ser. No. 188,224

Int. Cl.[4] B65D *27/38*

U.S. Cl. 206—617 12 Claims



1. A container having an opening-closing flap with inside and outside surfaces and provided with an opening device which comprises:

a strip of adhesive disposed along a straight line on the inside surface of said opening-closing flap for sealing the container,

a non-tearable guide strip disposed in a straight line along the outside surface of said opening-closing flap, and

a non-tearable, elongated straight tear band attached to the inside surface of said opening-closing flap, one elongated edge of said tear band being adjacent said adhesive strip, while the opposite elongated edge of said tear band is aligned with an edge of said guide strip whereby the tear band is disposed between said adhesive strip and said guide strip so that when said flap is sealed by said adhesive and said tear band is freed and pulled away from the container, the container is opened with a tear line which extends along the container flap in a straight line defined by said adhesive strip and said tear band.

4,877,140

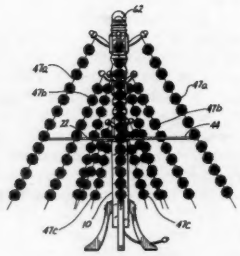
ROTATING CLOTHES TREE

Kil J. Lee, 508 Crocker Ave., Pacific Grove, Calif. 93950

Continuation-in-part of Ser. No. 48,324, May 11, 1987, abandoned. This application Aug. 1, 1988, Ser. No. 227,084

Int. Cl.[4] A47F *5/02*

U.S. Cl. 211—163 2 Claims



1. A convertible clothes stand comprising:

(a) a base member, said member being at least partially axially orificed, from its top downwardly, said base member including means to support said base member on a horizontal surface with the axis of said orifice in a substantially vertical orientation;

(b) a cylindrical axle rod, said rod having a portion of a configuration to fit into the orifice in said base member, and being inserted therein;

(c) a plurality of spool-like elements disposed in series on said axle rod, each of said spool-like elements having an internal diameter slightly greater than the external diameter of said axle rod, thereby being rotatable about said axle rod, and each of said spool-like elements being rotatable independently of the others;

(d) a plurality of support arms longitudinally extending angularly upwardly from, and disposed equi-angularly about, each of said spool-like elements to support a coat or other garment therefrom;

(e) each spool-like element above the lowermost said element being of a greater outside diameter than that immediately below it, and each support arm extending from the spool-like element above the lowermost such element, being of a greater longitudinal dimension than that of any of the arms extending from the spool-like element immediately below;

(f) the support arms extending from each spool-like element being vertically spaced from the arms extending from the adjacent spool-like element

(g) an annular support member mounted on top of the base member, the last said support member comprising:

(i) a central mounting ring fitting about the axle rod and resting on top of the base member, and

(ii) a plurality of coaxial annular support elements secured in spaced relationship to each other and to said mounting ring by a plurality of struts radiating from said ring and to which struts said annular support elements are secured; and

(h) a plurality of decorative rigid branch members, each branch member being secured at one of its extremities to one of said support arms to hand downwardly therefrom and to supportingly rest upon one of said annular support elements, with all branch members depending from the support arms extending from a particular spool-like member, supportingly resting upon the same annular element for disposition in an imaginary cone coaxial with said axle rod.

4,877,141

PRESSURE RESISTANT BOTTLE-SHAPED CONTAINER

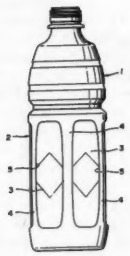
Yoshiaki Hayashi, Matsudo; Takeshi Itakura, Adachi; Toyoji Kato, and Yukio Koshidaka, both of Matsudo, all of Japan, assignors to Yoshino Kogyosho Co., Ltd., Tokyo, Japan

Filed Feb. 16, 1988, Ser. No. 155,732

Claims priority, application Japan, Oct. 3, 1986, 61-235865; Feb. 17, 1987, 62-34008; Feb. 17, 1987, 62-34007

Int. Cl.[4] B65D *23/00*

U.S. Cl. 215—1 C 5 Claims



1. A pressure resistant bottle-shaped container having a body with an outer surface including panels surrounded by outer sheaths, wherein:

each panel has a longitudinal height and a transverse width,

and includes stress absorbing tones comprising vertexes recessed from the outer surface of the panel toward the interior of the container and bending lines formed, in V shape and inverted V shape in mirror-image, confronting relationship from the vertexes toward the outer sheaths,

said vertexes are formed on the center line of the panel along the longitudinal height of the panel,

a flat recessed portion is formed between the vertexes at the center of the longitudinal height of the panel, and

a depth of a recessing step between the surface of the panel and the flat portion is 1.0 mm or less.

4,877,142

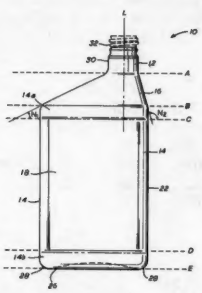
RECTANGULAR BOTTLE FOR MOTOR OIL AND LIKE FLUIDS

John P. Doering, Humble, Tex., assignor to Texaco, Inc., White Plains, N.Y.

Continuation of Ser. No. 53,762, May 26, 1987, abandoned. This application Jun. 3, 1988, Ser. No. 203,636

Int. Cl.[4] B65D *1/02*

U.S. Cl. 215—1 C **19 Claims**



1. A substantially rectangular bottle for motor oil and like fluids designed to be stacked and shipped on a standard 40 in.×48 in. GMA pallet without overhang, comprising:

a hollow body including a front wall, back wall, right side wall, left side wall and bottom, said front wall and said back wall are substantially parallel, and said right side wall and said left side wall are substantially parallel, said hollow body having an exterior length, between said right side wall and said left side wall, to exterior width, between said front wall and back wall, ratio of from about 1:0.53 to about 1:0.56;

a tubular spout through which said bottle may be filled and emptied, said spout being centrally oriented between said front and back walls of said bottle, the centerline of said spout being offset from said left side wall toward said right side wall between about 75% to about 80% of said exterior length of said hollow body; and

a tapered section interposed between and connecting said hollow body and said spout, whereby said front wall, back wall, right side wall and left side wall slope toward and merge into said spout, said front wall sloping at an angle of between about 60° to about 70°, said back wall sloping at a supplementary angle of between about 120° to about 110°, said right side wall sloping at an angle of between about 100° to about 110°, and said left side wall sloping at an angle of about 25°, from the horizontal toward said spout.

4,877,143

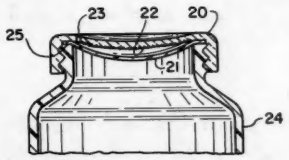
TAMPER EVIDENT INDICATING MEANS

Frank P. Travisano, 300 Buckelew Ave., Jamesburg, N.J. 08831

Filed Jun. 16, 1988, Ser. No. 207,458

Int. Cl.[4] B65D *55/02*

U.S. Cl. 215—230 **9 Claims**



1. A tamper-evident package for a vacuum packed consumer usable product, said package comprising: a container for the product, said container having an opening therein for a tamper-evident indicating means; a resilient diaphragm means, movable between a quiescent position and a flexed position, for sealing said opening, said diaphragm means being marked on its outer surface with warning indicia that indicates the container may have been tampered with; and a translucent closure means attached to said container adjacent said diaphragm means, said closure means having a light diffusing surface proximate to said warning indicia when said diaphragm means is in its quiescent position, the arrangement being such that said warning indicia on said diaphragm means is obscured and not visible through said closure means when said diaphragm means is flexed inwardly of said container and away from said closure means as a consequence of the vacuum within said container, and said warning indicia is visible through said closure means when said diaphragm means returns to its quiescent position proximate to said closure means when the vacuum within said container is lost.

4,877,144

PLASTIC THREADED SLEEVE

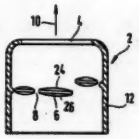
Klaus Thanisch, Zell, Fed. Rep. of Germany, assignor to Zeller Plastik Koehn, Graebner & Co., Zell, Fed. Rep. of Germany

Filed Mar. 16, 1988, Ser. No. 168,957

Claims priority, application Fed. Rep. of Germany, Mar. 16, 1987, 3708472

Int. Cl.[4] B65D *41/04*

U.S. Cl. 215—330 **6 Claims**



1. A threaded sleeve closure having a circumference and an axis manufactured by a process which includes stripping the finished closure from a mold in the direction of said axis, comprising:

(a) a skirt;

(b) screw thread means for mating with a thread on a neck of a container, said thread means being formed on a helical path on the interior surface of said skirt which corresponds and mates with a helical screw thread formed on the neck of a container which is to receive the closure, said closure helical path extending one full turn around said closure skirt circumference, said container helical

screw thread extending for more than one full turn around said neck;

(c) said screw thread means including a plurality of spaced thread segments located on said closure helical path;

(d) said segments having a base occupying a given surface area on said skirt and tapering to edges having a surface area less than said given surface area, thereby permitting said closure to be stripped from a mould in said direction of said axis; and

(e) said segments separated from one another in the direction of said circumference by spaces shorter than said segments.

4,877,145

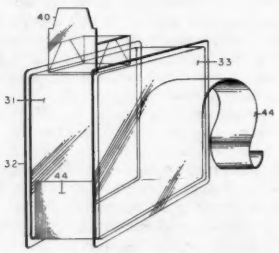
RIBBON WRAPPED INTRINSIC OPENING PLASTIC PACKAGE

Warren R. Manner, 11652 Camden St., Omaha, Nebr. 68164, assignor to Warren R. Manner, Omaha, Nebr.

Filed Feb. 29, 1988, Ser. No. 161,479

Int. Cl.[4] B65D *6/10*

U.S. Cl. 220—83 **19 Claims**



1. A package, comprising

upright front and back panels,

top, bottom and opposite end walls, each integrally connected to both said front and back panels and extended between said front and back panels, whereby said package is free of seams between said panels and walls,

a spout through one of said walls,

a closure flap integrally formed with one of said walls and movable between a closed position operatively covering and closing said spout and an open position away from said spout whereby contents may be inserted into and removed from said package through said spout,

flap securement means for releasably securing said flap in the closed position thereof, and

a removable elongated ribbon wrap extended around said package over said spout and operative to obstruct movement of said closure flap from its closed position and thereby prevent access to the contents of said package prior to removal of said ribbon wrap.

4,877,146

VACUUM CONTROLLED VAPOR RECOVERY SYSTEM

Robert S. Harris, Connersville, Ind., assignor to Stant Inc., Connersville, Ind.

Continuation-in-part of Ser. No. 148,384, Jan. 25, 1988, which is a continuation-in-part of Ser. No. 106,632, Oct. 8, 1987, Pat. No. 4,816,045, which is a continuation-in-part of Ser. No. 846,081, Mar. 31, 1986, Pat. No. 4,770,677. This application Mar. 24, 1989, Ser. No. 328,287

Int. Cl.[4] B65D *6/12*

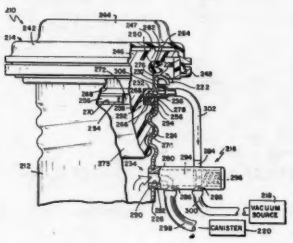
U.S. Cl. 220—85 VR **16 Claims**

1. A recovery system for recovering fuel vapor normally discharged from a fuel system during refueling, the recovery system comprising

a fuel tank filler neck having a mouth and a vent outlet spaced in relation to the mouth,

a fuel cap including closure means rotatably engaging the filler neck for closing the mouth, the closure means including first seal means for normally establishing a seal between the closure means and the filler neck,

vent means for selectively venting pressurized fuel vapor from the filler neck through the vent outlet, and



actuation means for actuating the vent means upon rotation of the cap relative to the filler neck to a position breaking said seal and prior to removal of the cap from the filler neck to vent pressurized fuel vapor in the filler neck through the vent outlet without venting pressurized fuel vapor through the filler neck mouth.

4,877,147

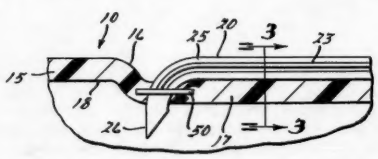
TANK COMPRISING EMBEDDED FLANGED CONDUIT

James P. Hyde, Saline, Mich., assignor to Ford Motor Company, Dearborn, Mich.

Filed Aug. 1, 1988, Ser. No. 226,901

Int. Cl.[4] B65D *25/00, 1/00*

U.S. Cl. 220—85 VR **15 Claims**



1. A molded plastic tank comprising a tank wall and a closed-section conduit comprising an external flange, at least an elongate portion of said closed-section conduit being at least partially embedded in said wall, wherein

(a) said flange extends longitudinally along at least said elongate portion of said closed-section conduit, and

(b) substantially the entire exterior surface of said flange is submerged within said tank wall.

4,877,148

DISPENSING STRAW FOR LIQUID CONTAINER

Gordon Larson, 1780 Pass Rd., and John Pates, 193 Miramar, both of Biloxi, Miss. 39531

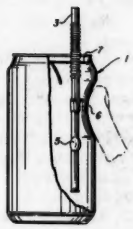
Filed Nov. 17, 1988, Ser. No. 272,435

Int. Cl.[4] A47G *19/22*

U.S. Cl. 220—90.2 **12 Claims**

1. A straw assembly for a liquid container having a top wall, bottom wall and side wall with an openable closure for the dispensing opening of the container in the top wall including a straw disposed in said container, means for retaining the straw attached to the side wall of the container in the same position completely within the container with the openable closure in

place closing the container or with the container open and means for causing the straw to be released to emerge through



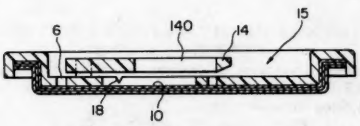
the dispensing opening when the closure is opened by depressing a portion of the external surface of the container.

4,877,149

SCORED CONTAINER TOP

Akinori Kodama, and Takeshi Takahashi, both of Kanagawa, Japan, assignors to Showa Denko Kabushiki Kaisha, Tokyo, Japan

Filed Nov. 30, 1988, Ser. No. 278,529
Int. Cl.[4] B65D *17/30*
U.S. Cl. 220—267 **3 Claims**



1. A top adapted to be attached to a body of a can-like container, comprising: a multilayer circular base (4) composed of a gas-insulating basic material (19) and resin layers (20, 21) provided on both the sides of said basic material and capable of being fuse-bonded, a resin layer (5) is deposited, by injection molding, on one side of said base, a central portion (3) of said top having a closed figure defined by a continuous groove (6) extending through said molded resin layer and down to said base, a projection (9) disposed inside said groove and extending from a pedestal (8), a butt of a pull tab (12, 14) joined to said pedestal, and scores (18) extending across the projection perpendicular to a direction of opening of said top.

4,877,150

DISPOSABLE CONTAINER

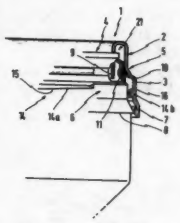
Werner Otto, Forstweg 2, D-5910 Kreuztal; Ulrich Beese, Brunnenstrass 6, D-5963 Wenden-Hünsborg, and Martin Schmidt, Am Zollstock 11, D-3565 Breidenbach-Achenbach, all of Fed. Rep. of Germany

Filed Dec. 28, 1987, Ser. No. 138,444
Claims priority, application Fed. Rep. of Germany, Jan. 12, 1987, 3700683
Int. Cl.[4] B65D *43/14*
U.S. Cl. 220—304 **19 Claims**

1. A disposable container and lid, having both a releasable seal and a non-releasable seal, comprising

(a) a container having a filling opening at one end and a sealing ring about its outer periphery proximate said one end, said container further having an outer surface extending away from said one end; a container locking projection extending from said outer surface; and an outwardly increasing ramp face extending from said outer surface, said ramp face terminating in a retaining projection; and

(b) a lid sized for closure of said filling opening, said lid having a downwardly projecting inner edge surface, said inner edge surface having an inner encircling counter face engageable against said sealing ring; said inner edge surface also having a lid locking projection extending inwardly from said surface and engageable in releasable locking engagement against said container locking projection; said inner edge surface terminating in an inwardly



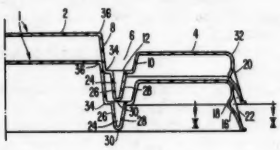
directed detent engageable in non-releasing locking engagement against said retaining projection, whereby said sealing ring is partially compressed when said lid locking projection is in locking engagement with said container locking projection, and said sealing ring is further partially compressed when said detent is in locking engagement against said retaining projection.

4,877,151

SNAP-ON LID AND MOLD FOR MAKING THE LID

Jonathan E. Rush, 310 Prospect St., Philipsburg, N.J. 08865; Phillip D. Scalvini, 1267 Saddle Dr., Nazareth, Pa. 18064, and Reinhold Gerber, 3000 Swanson St., Easton, Pa. 18042

Filed Jun. 30, 1988, Ser. No. 214,053
Int. Cl.[4] B65D *21/02*
U.S. Cl. 206—514 **37 Claims**



1. A stack of disposable plastic circular lids for containers having openings surrounded by a beaded rim wherein the lids have aligned central axes and wherein each said lid comprises;

a. a generally circular closure wall including an annular central portion lying in a first plane, an annular outer portion lying in a second plane below said first plane and an annular U-shaped recess extending between said central portion and said annular outer portion and having an inner wall, an outer wall and a bottom wall lying in a third plane below said second plane formed by said annular outer portion;

b. a peripheral skirt depending from a rim portion of said closure wall for engaging the beaded rim of a container; and

c. stabilizing means for distributing and counteracting both lateral and axial loads to maintain stack integrity while preventing jamming of adjacent lids, said stabilizing means including:

(i) anti-jamming means for preventing sticking of adjacent lids including a plurality of lug members extending downwardly from said bottom wall for a sufficient distance to engage the bottom wall of the lower adja-

cent lid, the inner radial surface of each lug member being spaced radially outwardly along its entire axial length from the inner wall of said U-shaped recess; and

(ii) anti-shifting means for preventing relative lateral movement of adjacent lids, said antishifting means including the portion of said inner wall which lies above the bottom wall of the upper adjacent lid.

4,877,152

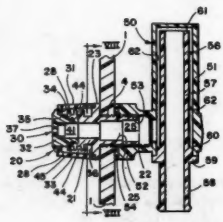
FUEL TANK VENT

Warwick M. Whitley, II, Panama City, Fla., assignor to Attwood Corporation, Lowell, Mich.

Filed Feb. 10, 1989, Ser. No. 308,558

Int. Cl.[4] B65D *25/02*; F16K *24/04*

U.S. Cl. 220—374 **15 Claims**



1. In a fuel tank for a marine vessel in which an elongated member is provided to extend through an opening in the hull of said vessel; said elongated member having an inner end adapted to be located inside said hull and an outer end adapted to be located outside said hull and an opening extending therethrough providing communication between the inner and outer ends of said elongated member with means for securing said elongated member to said hull in said opening the improvement comprising:

an elongated housing adapted to be located inside said hull and having an open lower end and a closed upper end and a chamber communicating with said opening in said elongated member;

said housing being arranged at an angle to said elongated member; and

a vent tube open at both of its ends extending into said chamber short of said closed upper end and of a smaller outer cross section than the inner cross section of said housing to provide a space therebetween; said vent tube having an end extending out of said chamber for connection to a hose leading to a fuel tank; and

means at the lower end of said housing for closing said space between said tube and housing whereby air and fumes vented from said tank are required to pass upwardly through said tube and then downwardly through said space and into the opening of said elongated member.

5. In a fuel tank for a marine vessel in which an elongated member is provided to extend through an opening in the hull of said vessel; said elongated member having an inner end adapted to be located inside said hull and an outer end adapted to b located outside said hull and an opening extending therethrough providing communication between the inner and outer ends of said elongated member with means for securing said elongated member to said hull in said opening the improvement comprising a cover assembly having a top secured to said elongated member and having a side wall extending from said top to the base thereon and spaced from said elongated member to form a passageway for the flow of air from the said top to said base; said cover assembly having a first vent opening means inside the side walls near the top of said cover assembly to provide communication with the vent opening through said elongated member and said passageway; and a second vent opening means located in said side wall adjacent the base thereof to provide communication with said passageway and the atmosphere outside said cover only adjacent said base whereby the passage of air for communication with the said opening of said elongated member is confined through said passageway extending along said elongated member between said first vent opening near said top to said second vent opening adjacent said base.

11. In a fuel tank for a marine vessel in which an elongated member is provided to extend through an opening in the hull of said vessel; said elongated member having an inner end adapted to be located inside said hull and an outer end adapted to be located outside said hull and an opening extending therethrough providing communication between the inner and outer ends of said elongated member;

means for securing said elongated member to said hull in said opening in said hull, the improvement comprising:

a cover assembly including a trim cover having a top with an opening therein and a wall extending from said top substantially to said hull;

a separate retainer member extending through said opening, said retainer member having at one end a closure means for closing the said opening in said trim cover and at the other end a securing means for removably securing said retainer member to the outer end of said elongated member;

vent openings in said retainer member between said closure means and securing means; and

vent openings in the wall of said trim cover adjacent said hull.

4,877,153

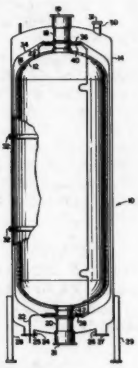
METHOD AND APPARATUS FOR STORING CRYOGENIC FLUIDS

Alexander P. Varghese, Bethlehem, and Robert H. Herring, New Tripoli, both of Pa., assignors to Air Products and Chemicals, Inc., Allentown, Pa.

Filed Feb. 4, 1988, Ser. No. 152,278

Int. Cl.[4] B65D *90/04*

U.S. Cl. 220—469 **12 Claims**



1. In a dewar for storing or transporting cryogenic fluid of the type containing an outer vessel and an inner vessel disposed therein, said inner vessel including means to admit and withdraw cryogenic fluid from the interior thereof, and insulation between said inner and outer vessels, the improvement comprising:

disposing at least one metallic transient heat shield between said inner and outer vessels, said heat shield containing means to retain refrigeration, said means to retain refrigeration adapted to be contacted by cold vaporized cryogen as it is withdrawn from said inner vessel, said means to retain refrigeration also includes a heat sink in heat exchange with said vapor withdrawal means.

4,877,154

DISPENSING CONTAINER FOR PAPER TISSUES AND THE LIKE

Sumio Matsui, 5-7, Kitami 9-chome, Setagaya-ku, Tokyo, Japan

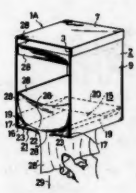
Continuation of Ser. No. 55,157, May 28, 1987, Pat. No. 4,768,679, which is a continuation of Ser. No. 783,342, Oct. 2, 1985, Pat. No. 4,678,099. This application Jul. 27, 1988, Ser. No. 224,885

Claims priority, application Japan, Feb. 19, 1985, 60-29390; Aug. 22, 1985, 60-188504

The portion of the term of this patent subsequent to Sep. 6, 2005, has been disclaimed.

Int. Cl.[4] B67H *1/00*

U.S. Cl. 221—48 **4 Claims**



1. In combination with a stack of folded and partially interleaved thin and soft sheets, a container holding the stack such that the sheets can be drawn one at a time from the container and that, after one sheet is drawn from the container, the next sheet is ready to be drawn from the container, the container having:

a bottom formed with two pairs of opposing lower flexible lugs together defining a discharge port consisting of a central discharge port and four blind port extensions extending obliquely towards four corners of the bottom of the container from the central discharge port and having respective rounded ends, the flexibility of the lugs being such that on pulling of the lowermost sheet of the stack down through the discharge port, first the sheet flexes down one of the lugs of one of the pairs, then both lugs of the other pair, and finally the other lug of the one pair, the stack of the shee s thus being supported normally by the two pairs of the lower flexible lugs and by at least two lugs at all times as the sheet is drawn out from the discharge port of the container; and

one pair of opposite side flaps forming respective upper flexible lugs each extending to the full extent of the associated side of the container and extending from said associated side towards said discharge port, the stack substantially resting on said upper flexible lugs, the upper flexible lugs guiding the sheets towards the discharge port as the sheet is drawn out from the container by way of said lower flexible lugs.

4,877,155

SPILL PROTECTING APPARATUS

Richard H. Tull, Marietta, Ga., assignor to MGM Petro Equipment & Enviro Services, Inc., Lakeland, Fla.

Filed Aug. 23, 1988, Ser. No. 235,300

Int. Cl.[4] B67D *5/00*; F16N *33/00*

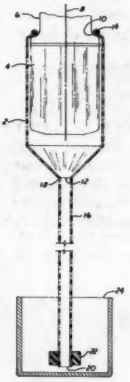
U.S. Cl. 222—108 **4 Claims**

1. Apparatus for preventing spillage of liquids from a dispensing pump during the changing of a filtering element removably attached to a mount on such pump, comprising

a hollow member elongated in an axial direction and formed of a liquid-tight, flexible, petroleum resistant material, said member having an upper open end and a lower open end distal said upper open end, said upper open end of sufficient area transverse to said axial direction to fit over said filtering element and having an open interior of sufficient length and cross sectional are a transverse to said axial direction to receive said filtering element completely therewithin;

constricting means engaging said upper open end of said hollow member for contracting said hollow member upper open end about said filtering element mount to support said hollow member on said mount, whereby the hollow member will be supported on the mount during the changing of the filtering element;

a flexible liquid conduit having a first end and a second end spaced from said first end, said first end being connected



to said lower open end of said hollow member and said conduit extending downwardly therefrom, whereby liquid introduced into the hollow member will flow by gravity out the lower open end of the hollow member and down the liquid conduit; and

anchoring means attached to a lower end of said liquid conduit to assist in maintaining said liquid conduit lower end in a predetermined position within a receiving container, whereby the liquid conduit and anchor means will resist movement relative to the container during the changing of the filtering element.

4,877,156

COLLAPSIBLE AND INFLATABLE PISTON FOR TWO- OR MULTI- COMPARTMENTAL CONTAINER

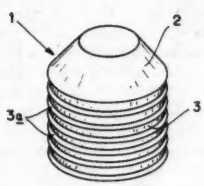
Frank Clanet, and Anne Dellerm, both of 4 bis Sentier des Voisinoux, 92190 Meudon-Bellevue, France

Continuation of Ser. No. 884,636, Jul. 11, 1986, abandoned. This application Dec. 9, 1987, Ser. No. 132,634

Claims priority, application France, Mar. 24, 1986, 86 04186

Int. Cl.[4] B67D *5/42*

U.S. Cl. 222—386.5 **19 Claims**



1. A collapsible and inflatable piston, particularly useful in containers for packaging requiring a fluid-tight separation between the packaged product and a propellant agent for said piston, comprising:

a hollow vessel having a frustoconical cap closed at one end

and extended by a cylindrical portion open at the base, forming a skirt,

said cylindrical portion having a plurality of external semi-toric sealing means for forming a seal in a fluid-tight manner with the inner wall of the container, the semi-toric sealing means closest to the frustoconical cap being located where said cap meets said cylindrical portion and is evenly integral to said cap,

whereby when said piston inflates, radial forces act on said closest semi-toric sealing means in a radial direction so as to enhance the seal between the piston and the container,

said piston being formed of an elastomeric material that is impermeable to gases and liquids.

4,877,157

DISPENSER FOR FLUID PRODUCTS

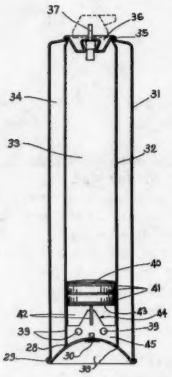
Lorenzo Saulle, Pieve Emanuele, Italy, assignor to Stacos di Saulle Lorenzo e Pontarollo Luciana s.n.c., Milan, Italy

Continuation of Ser. No. 11,105, Feb. 5, 1987, abandoned. This application Feb. 23, 1989, Ser. No. 315,350

Claims priority, application Italy, Feb. 6, 1986, 19323 A/86; Jul. 31, 1986, 21352 A/86

Int. Cl.[4] B65D *83/14*

U.S. Cl. 222—387 **1 Claim**



1. A dispenser for flowable materials which comprises: a tubular outer container having an open lower end, a tubular inner container having an open lower end positioned coaxially and concentrically within the outer container, an outer annular chamber between said outer and said inner container for compressed air, said outer container and said inner container each having an upper end, said upper ends being sealed, a first valve positioned on said sealed ends for ejection of said flowable material, a convex bottom sealed to the lower ends of said outer container and said inner container, a filling valve on said convex bottom, a piston slidable within said inner container defining in the inner tubular container an upper chamber for the flowable material and a second lower chamber between said piston and said bottom for the compressed air, said piston being provided with lower guiding fins projecting diametrically across the lower surface thereof into said second lower chamber, radial holes in the lower part of said inner tubular container for communicating said outer annular chamber with said second lower chamber, said piston being made of flexible elastic material, said radial holes being below the bottom and being aligned with said guiding fins, said fins being V-cut in the lower central portion thereof, whereby a free space for said filling valve is provided.

4,877,158

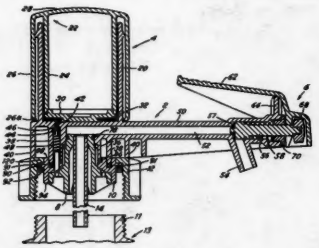
FLUID DISPENSING APPARATUS

Tilmann L. Kohler, 31 Blossom Waye, Heston, Middlesex TW5 9HB, United Kingdom

Filed Apr. 12, 1988, Ser. No. 180,400

Int. Cl.[4] B65D *83/14*; B05B *11/06*

U.S. Cl. 222—400.8 **12 Claims**



1. Apparatus for dispensing liquids from a container through an opening defined by the container, the apparratus comprising:

a body portion,

a pump assembly for pumping air, supported on the body portion,

a valve portion having an outlet duct supported on the body portion,

a valve housed in said valve portion for opening and closing the duct,

a locking member for locking the body portion on to the opening of said container,

a locking member retainer rotatably supporting the locking member,

a fastening member defining a liquid flow passage, the fastening member being arranged to be fastened to the body portion, to sealingly couple the liquid flow passage to the outlet duct and to lock the locking member retainer to the body portion, the fastening member and the locking member retainer when locked to the body portion defining an uninterrupted fluid passage from the pump assembly which does not directly communicate with the liquid flow passage, and

sealing means located on the locking member retainer for enabling a seal to be effected between the container and the locking member retainer when the locking member retained by the locking member retainer is locked to the container.

4,877,159

POUR DISPENSER

Victor Strand, Yorba Linda, Calif., assignor to Strand Art Co., Inc., Anaheim, Calif.

Filed Jul. 28, 1988, Ser. No. 225,195

Int. Cl.[4] B67D *3/00*; B65D *47/00*

U.S. Cl. 222—484 **8 Claims**

1. In a pour dispenser for pouring fluid from a container, the combination of:

a body having an outlet nozzle and an adapter for mounting said body on a container;

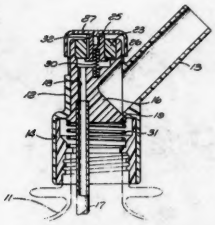
a piston in said body, with said piston and body having first interengaging valve means with said piston slideable in said body between a first valve open condition providing a first flow path between the container and said nozzle, and a first valve closed condition blocking fluid flow between the container and said nozzle,

said piston including a vent line for positioning in the container;

a plunger in said piston, with said plunger and piston having second interengaging valve means with said. plunger

slideable in said piston between a second valve open condition providing a second fluid flow path between the container and the atmosphere, and a second valve closed condition blocking fluid flow between the container and the atmosphere; and

spring means between said plunger, piston and body for



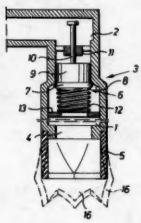
urging said plunger to said second valve closed condition and said piston to said first valve closed condition, with pressure on said plunger actuating said spring means and moving said plunger to said second valve open condition to open said second fluid flow path and then moving said piston to said first valve open condition to open said first fluid flow path.

4,877,160

VALVE UNIT

Jackie Derving, Malmö, Sweden, assignor to Tetra Pak International AB, Lund, Sweden

Continuation of Ser. No. 358,705, Mar. 16, 1982, abandoned. This application Mar. 29, 1989, Ser. No. 330,999
Claims priority, application Sweden, Apr. 1, 1981, 8102088
Int. Cl.[4] B67D *5/72*
U.S. Cl. 222—494 **11 Claims**



1. A valve unit comprising:

valve body means having a valve chamber, an inlet duct and an outlet duct;

a flexible material nozzle secured over said outlet duct of said valve body means, said nozzle being provided with a slit-like opening which opens in response to fluid pressure in said valve chamber and which is resiliently biased into a closed position; and

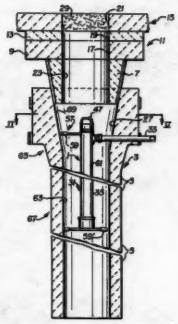
means within said valve chamber for sealing closed said inlet duct and for changing the volume of the valve chamber, said sealing and changing means being biased so as to seal off said inlet duct and to increase the volume of the valve chamber when the fluid pressure upstream of the inlet duct falls below a predetemined level, thus reducing the fluid pressure in said valve chamber and closing said opening rapidly.

4,877,161

TELESCOPING DEVICE FOR UNPLUGGING A VESSEL DISCHARGE PORT

Michael F. Harasym, Havertown, Pa., assignor to Vesuvius Crucible Company, Pittsburgh, Pa.

Continuation-in-part of Ser. No. 930,484, Nov. 14, 1986, Pat. No. 4,746,037. This application May 17, 1988, Ser. No. 195,040
Int. Cl.[4] C21C *5/48*
U.S. Cl. 222—591 **17 Claims**



1. An apparatus for unplugging a vessel discharge port, the vessel having refractory pouring means associated therewith positioned directly below the discharge port, the pouring means having an axial bore formed therein, said apparatus comprising:

an elongated tubular housing having a hollow interior chamber for coaxial placement within the bore of said refractory pouring means;

a condiut communicating with the interior chamber of the housing for introducing a pressurized gas into the housing;

an axialy displaceable tube at least partially disposed within said housing, said tube having an upper end disposed outside the housing and an open, flared lower end disposed within said housing, said tube adapted to be projected upwardly when said pressurized gas is introduced into the housing;

bushing means disposed within and secured to an upper end of said housing for axially guiding said axially diaplaceable tube and for forming a stop for said flared lower end thereof; and

a plurality of radially and axially spaced-apart centering members disposed on said elongated tubular housing extending radially outwardly therefrom for axially aligning said housing relative to the bore of said refractory pouring means and to said discharge port whereby said displaceable tube is axially aligned within the bore of the refractory pouring means as it is projected upwardly therein.

4,877,162

BASEBALL GLOVE SHAPER

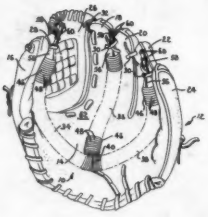
Michael L. McGinley, 5710 Cedar, Roeland Park, Kans.

Filed Apr. 21, 1988, Ser. No. 184,599
Int. Cl.[4] A41D *1/00*; D06C *15/00*
U.S. Cl. 223—78 **20 Claims**

1. A device for shaping a ball glove having a palm, a thumb extending from the palm, a finger section extending from the palm, a webbing between the thumb and finger section, and laces interconnecting the webbing with the thumb and with the finger section, said device comprising:

at least three elongate arms including first, second and third arms interconnected in a manner permitting application of said arms to the glove with one end of each arm applied to the palm of the glove, each arm having a free end opposite said one end; and

each arm being pliable and constructed to retain the shape of which it is bent to permit the first arm to curve along the palm and generally between the thumb and webbing, the second arm to curve along the palm and along the finger



section and the third arm to curve along the palm and along the finger section at a location more remote from the webbing than the second arm, whereby the arms cooperate to hold the glove in a configuration to present a ball receiving pocket adjacent the webbing.

4,877,163

GARMENT HANGER ACCESSORY

Karen M. Zimmerman, 1949 Woodhaven Dr., Fort Wayne, Ind. 46819-1053

Filed Jul. 26, 1988, Ser. No. 225,025
Int. Cl.[4] A47G *25/48*
U.S. Cl. 223—93 **7 Claims**

1. A detachable accessory device for a garment hanger, comprising:

a plastic ring sized so as to slide over and snugly fit around a portion of the garment hanger;

a plurality of flexible, elastic elements commonly connected at first ends thereof to said plastic ring, each of said elastic elements having a second end;

a plurality of plastic fastening elements, each connected to the second end of one of said flexible, elastic elements, each of said fastening elements having a pair of opposing body elements movable between open and closed positions, and each of said body elements having an outwardly facing exterior surface; and

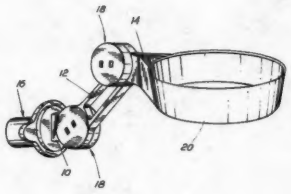
decorative fabric means for covering substantially all of said outwardly facing exterior surfaces of the opposing body elements to shield said elements from view and to prevent unintended and potentially damaging contact with an overlying garment.

4,877,164

DEVICE FOR HOLDING CUPS, CANS, AND SIMILAR ARTICLES IN VEHICLES

Walter H. Bancom, Loudonville, N.Y., assignor to Datamain 2000, Inc., Loudonville, N.Y.

Filed Jun. 17, 1988, Ser. No. 208,404
Int. Cl.[4] B60R *7/06*; E05D *3/06, 7/10*
U.S. Cl. 224—42.44 **11 Claims**



10. A holder for cups and similar articles, comprising:

three adjustably interconnectable elongated articulated members,

a first of said members terminating at one end in an expandable plug mounting means arranged and constructed to form a secure, removable connection within a hollow cylindrical opening and terminating at its other end in a hollow cylindrical collar means having a plurality of internal teeth and a central bore,

a second of said members terminating at one end in an article holding means and at its other end in a hub means having a plurality of external teeth and a pair of spaced-apart, axially extending legs having oppositely directed hook means at the ends thereof, and

the third of said members being arranged and constructed to interconnect the first and second members together to provide a rigid, angularly adjustable assembly,

one end of said third member terminating in a hub means having a plurality of external teeth and a pair of spaced-apart, axially extending legs having oppositely directed hook means at the ends thereof, said hub means arranged and constructed to fit within the collar means of said first member with the external teeth of said hub means intermeshing with the internal teeth of said collar means and with the legs of said hub means passing through the central bore of said collar means so that the hook means at the ends of said legs snap over a portion of said collar means and retain the hub means of said third member and the collar means of said first member together,

the other end of said third member terminating in a hollow cylindrical collar means having a plurality of internal teeth and a central bore, said collar means of said third member arranged and constructed to fit over the hub means of said second member with the internal teeth of said collar means intermeshing with the external teeth of the hub means of said second member and the legs thereof passing through the central bore of said collar means so that the hook means at the ends of said legs snap over a portion of said collar means and retain the collar means of said third member and the hub means of said second member together.

4,877,165

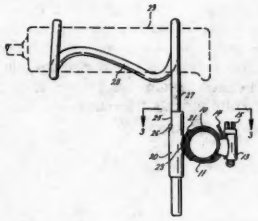
FISHING ROD HOLDER

William L. Behrle, 385 Grand Terrace Ct., Fenton, Mo. 63026

Filed Jun. 20, 1988, Ser. No. 208,727
Int. Cl.[4] B60R *11/00*; A01K *97/10*
U.S. Cl. 224—42.45 R **2 Claims**

1. A fishing rod holder comprising a hose clamp type of strap having substantially annular inner and outer surfaces and

a tubular receptacle having a first end, an opposite end, and substantially annular inner and outer surfaces, for receiving the shank of a fishing rod holder member, the hose clamp type of strap including means securely attaching said strap to a support extending in a first direction, such as a horizontal direction, the tubular receptacle being disposed transversely to the axis of the hose clamp, such as in a vertical direction, there being a strip



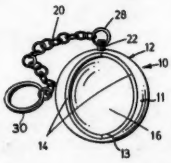
of metal between said outer surfaces of the tubular receptacle and the strap and tightly bonded to both and through which the tubular receptacle is attached to the strap at the outside thereof, the tubular receptacle having a notch in said first end, and a fishing rod holder member having a shank with a nodule thereon, removably inserted into the tubular receptacle with the nodule engaging within the notch.

4,877,166

APPARATUS FOR RETAINING A BALL

Robert C. Gelinas, Jr., 493 Gregory La., West Chester, Pa. 19380

Filed May 2, 1988, Ser. No. 189,019
Int. Cl.[4] A45F *5/00*
U.S. Cl. 224—223 **8 Claims**



5. A device for holding one or more objects comprising:

at least one spherically shaped body constructed from a resilient material and having an interior for receiving and securely holding one object in surrounding relationship and including an opening having the form of a wedge shaped slice for permitting insertion of said object into and removal of said object from said interior, said opening allowing visual inspection of at least a portion of said object when said object is retained in said body, said interior cavity being of a spherical shape; and

means for attaching each said body to a second object, said means for attaching also removably securing the body to the second object.

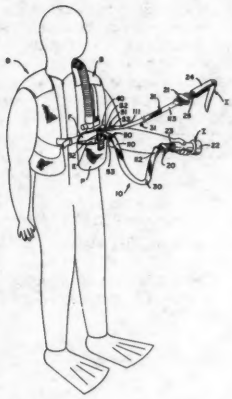
4,877,167

RETENTION SYSTEM FOR DIVER ACCESSORIES

Glenn A. McNemar, 2031 Hillside Dr., Falls Church, Va. 22043

Filed Jun. 10, 1988, Ser. No. 204,835
Int. Cl.[4] A45F *5/02*
U.S. Cl. 224—269 **28 Claims**

1. A retention system comprising a lanyard having opposite relatively spaced first and second ends, first clip means at said lanyard first end for securing an implement thereto, second clip means at said second lanyard end for securing said lanyard to a garment whereby the lanyard retains the implement connected to the garment, releasable connecting means disposed between said second clip means and said second lanyard end for releasing said lanyard from said second clip means without affecting the secured connection between said second clip



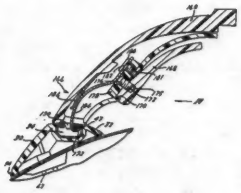
means and garment said first clip means includes relatively releasable fastener means for relatively releasably fastening an implement to said lanyard, and said second clip means includes relatively permanently fastened fastener means for relatively permanently fastening said second clip means to a garment.

4,877,168

VEHICLE ARTICLE CARRIER

John A. Bott, 931 Lakeshore Dr., Grosse Pointe Shores, Mich. 48236

Continuation of Ser. No. 3,134, Jan. 14, 1987, Pat. No. 4,754,905, which is a continuation of Ser. No. 778,385, Sep. 20, 1985, Pat. No. 4,684,048. This application Jun. 30, 1988, Ser. No. 213,899
The portion of the term of this patent subsequent to Jul. 5, 2005, has been disclaimed.
Int. Cl.[4] B60R *9/04*
U.S. Cl. 224—321 **3 Claims**



1. An article carrier adapted to be secured to a motor vehicle adjacent to a generally horizontally extending body surface on said vehicle comprising a pair of elongated support members adapted to be secured to said vehicle and having upper article supporting surfaces on the upper sides of said support members, an upward facing channel extending longitudinally on each of said support members, and clamping surfaces extending longitudinally within the channel

and toward each other, at least one cross member having two end portions, and means for locking said cross mem-

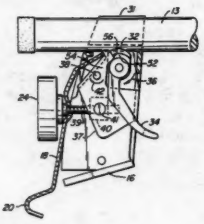
ber in a selected position on each support member, said locking means having a housing with a lower surface, an outside surface and an inside surface spaced transversely from said outside surface by said lower surface and a first portion mounted to one end portion of said cross member and a second portion removably engaged with the corresponding channel of one of said corresponding support members, said locking means including a hook extending from said second end portion and projecting into said channel, yoke means associated with said hook and disposed on said inside surface of said housing, and rotatable means associated with said yoke means and hook for moving said hook toward and away from said second end portion such that said hook engages one of said clamping surfaces and forces said lower surface of said housing against said clamping surfaces.

4,877,169

SELF-TIGHTENING VEHICLE ROOF RACK

Michael Grim, Bayside, Calif., assignor to Yakima Products, Inc., Arcata, Calif.

Filed Mar. 15, 1988, Ser. No. 168,786
Int. Cl.[4] B60R *9/04*
U.S. Cl. 224—331 **9 Claims**



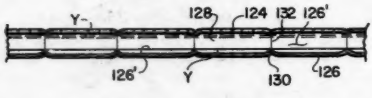
1. A self-tightening vehicle roof rack comprising:
a crossbar;
a pair of pedestals, each having an inner face and an outer face;
a pair of cams; one such cam rotatably mounted to each said pedestal, and arranged thereon to clamp said crossbar to said pedestal upon rotation of said cam toward the other pedestal;
a pair of threaded studs, one such threaded stud accessible through an opening in each said outer face, operable independently from said cams, for securing each said pedestal to said vehicle roof; and
lever means, mounted to each said pedestal and accessible through an opening in said inner face, for manually rotating each said cam into a position clamping said crossbar to said pedestal independently of said threaded studs.

4,877,170

TUBULAR CONDUIT FOR TRANSPORTING TRAVELING TEXTILE YARN

Alan Gutschmit, P.O. Box 708, Troy, N.C. 27371

Filed Jan. 22, 1985, Ser. No. 693,532
Int. Cl.[4] B65H *57/12*
U.S. Cl. 226—196 **13 Claims**



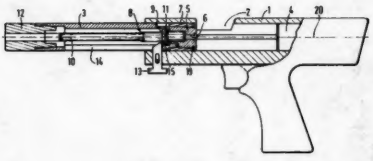
1. A continuous extended length flexible tubular conduit adapted to be resiliently formed to selected curvi-linear configurations for transporting a traveling textile yarn or the like in curvi-linear paths from one location to another remote location, said tubular conduit comprising an annular interior wall surface defining a yarn pathway and a plurality of interior yarn engaging portions projecting inwardly from said annular interior wall surface at spacings along the length of said tubular conduit, said yarn engaging portions being adapted to engagingly support said yarn and maintain it out of substantial contact with said interior wall surface intermediate said yarn engaging portions to reduce the amount of frictional contact between said yarn and said tubular conduit as said yarn travels in said pathway therethrough, said yarn engaging portions comprising inwardly formed deformations in said tubular conduit forming crimps therein.

4,877,171

INDIRECT FIRING FASTENER DRIVING APPARATUS WITH FIRING POWER ADJUSTMENT

Roland Almeras, Tournon, France, assignor to Societe De Prospection Et D'Inventions Techniques, Bourg Les Valence, France

Filed Sep. 14, 1988, Ser. No. 243,813
Claims priority, application France, Sep. 15, 1987, 87 12755
Int. Cl.[4] B25C *1/14, 1/18*
U.S. Cl. 227—10 **13 Claims**

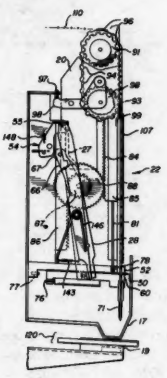


1. An indirect firing fastener driving apparatus, comprising:
a barrel holder;
a barrel movable within said barrel holder between a rearward position and a forward position;
propulsive charge means mounted within said barrel for generating combustion gases when a fastener driving operation is to be performed;
a piston mounted in frictional contact within said barrel so as to be driven by said combustion gases and to in turn drive said fastener;
a pawl mounted upon said barrel holder so as to project through a groove, defined within said barrel, and engage said piston so as to retain said piston in a fired position;
a combustion chamber defined between said piston and said propulsive charge means; and
means for varying the volume of said combustion chamber comprising adjustment means mounted upon said barrel so as to be movably adjustable with respect to said barrel, and stop means operatively engaged with said piston and having a front end and a rear end, wherein said rear end is in contact with said adjustment means, and when said barrel is disposed in said forward position, said front end of said stop means is in contact with said pawl so as to position said piston within said barrel in accordance with said movable adjustment of said adjustment means with respect to said barrel.

4,877,172
DISPENSING OF ATTACHMENTS

Harlow Franklin, Randolph, Mass.; William J. Cooper, Woonsocket, R.I., and Charles L. Deschenes, No. Attleboro, Mass., assignors to Deanison Manufacturing Company, Framingham, Mass.

Filed Sep. 2, 1988, Ser. No. 239,695
Int. Cl.[4] A41H 37/00
U.S. Cl. 227—67 18 Claims



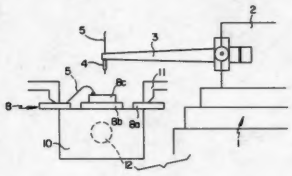
1. Apparatus for dispensing attachments, comprising at least one hollow slotted needle;
shuttle means to which said hollow needle is secured, reciprocatively mounted to move between a first position and a second position;
means for advancing a connected plurality of attachments to said needle while said shuttle is at said first position;
isolating means for causing an individual attachment in said needle to be isolated from said connected plurality while said attachment is housed in the needles; and
means for expelling the individual attachment from said needle while said shuttle means is located at said second position,
wherein the shuttle, advancing means, isolating means, and ejecting means are mounted to a head member which moves between an attachment dispensing position and a withdrawn position, further comprising an electric motor driven assembly for reciprocating the head member including a clutch means for coupling said electric motor to said head means in response to a user command.

4,877,173
WIRE BONDING APPARATUS

Hitoshi Fujimoto, and Hisao Masuda, both of Itami, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Japan

Continuation of Ser. No. 80,875, Aug. 3, 1987, abandoned. This application Nov. 23, 1988, Ser. No. 275,604
Claims priority, application Japan, Aug. 6, 1986, 61-185740
Int. Cl.[4] B23K 20/10
U.S. Cl. 228—1.1 7 Claims

1. A wire bonding apparatus which bonds electrodes and external leads of a semiconductor integrated circuit element, said wire bonding apparatus comprising:
a heat block having a lead frame which supports the semiconductor integrated circuit element in a bonding position; and
an electronic horn fixed to a bonding head and generating ultrasonic waves to bond the electrodes and the external leads when the circuit element is in the bonding position, said ultrasonic horn being formed of a metallic material having a thermal expansion coefficient (TEC) of a maximum of 5×10^{-6}/°C. and having a head portion and a root portion from a lengthwise midpoint, said head and root portions having a maximum length of 50×10^{3} μm after thermal expansion, and said ultrasonic horn and heat block being operated to generate a maximum bonding temperature in said head portion of 80° C. during bonding, said head portion having an actual length which is inversely

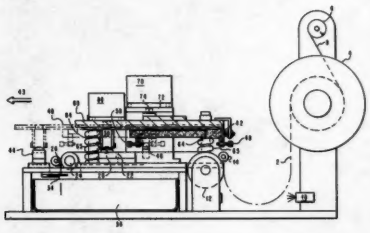


proportional with the TEC at a mean temperature difference between temperature during bonding and temperature before bonding, the head and root portions having an actual length before thermal expansion which limits locational errors of said horn due to thermal expansion to a maximum value of 5 μm.

4,877,174
TAB DEVICE EXCISE AND LEAD FORM APPARATUS

Peter H. Bruhn, Georgetown, Tex., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Dec. 21, 1988, Ser. No. 289,996
Int. Cl.[4] H01L 21/98
U.S. Cl. 228—5.1 10 Claims



1. Apparatus for automatedly handling leaded electronic components born on a flexible tape comprising:
means for simultaneously excising a component from the tape and forming its leads;
means for feeding the tape to and past said means for simultaneously excising and forming;
means for precisely aligning a component at said means for simultaneously excising and forming;
a component pickup station; and
means for conveying a component, excised and formed, to said station pickup for subsequent operations thereon.

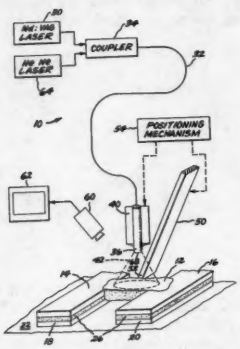
4,877,175
LASER DEBRIDGING OF MICROELECTRONIC SOLDER JOINTS

Marshall G. Jones, Scotia, N.Y., and Prem N. Batra, Cincinnati, Ohio, assignors to General Electric Company, Schenectady, N.Y.

Filed Dec. 30, 1988, Ser. No. 292,048
Int. Cl.[4] B23K 26/00, 26/04, 26/06
U.S. Cl. 228—102 20 Claims

1. A method of debridging microelectronic solder joints comprising positioning a tool in contact with a bridge of solder

which extends between soldered leads of microelectronic circuit; projecting a laser beam onto the solder bridge to heat the solder; controlling the laser beam power to cause melting



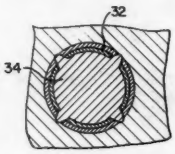
of the solder and wicking of the solder onto the tool; and removing the tool to remove the solder bridge between the leads.

4,877,176

SOLDERING PINS INTO PRINTED CIRCUIT BOARDS

Leon S. Kubis, West Palm Beach, Fla., assignor to Northern Telecom Limited, Montreal, Canada

Filed Nov. 25, 1987, Ser. No. 125,152
Int. Cl.[4] B23K *31/02*
U.S. Cl. 228—173.5 **17 Claims**



1. A method of soldering a pin having a splined section into a hole lined with conductive material in a printed circuit board comprising:

providing a layer of solidified solder within the hole and on the inner surface of the conductive material;

said layer of solder having a maximum nominal thickness of 0.001 inches;

providing a pin with a substantially circular cross-section and a plurality of splines protruding radially therefrom, the radial length of said protruding splines being substantially equal to the radial thickness of said conductive material and said solder layer, the diameter of said circular cross-section being substantially equal to the inner diameter of said lined, solder-layered hole;

inserting the pin into the hole to locate the splined section within the hole with the splines projecting through the solidified solder and into the conductive material;

with the board disposed with the pin and hole extending vertically and with the avoidance of additional solder, flowing solely the solder layer to bond the pin to the conductive layer, said solder flowing downwardly and increasing in thickness towards the bottom of the hole; and

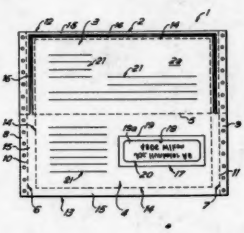
completely blocking all the gaps between the splines in at least one position along the hole.

4,877,177

WINDOW LETTER

Willi Felix, Strengelbach, Switzerland, assignor to Jos. Hunkeler Ltd., Wikon, Switzerland

Filed Jun. 4, 1987, Ser. No. 58,050
Claims priority, application Switzerland, Jun. 6, 1986, 02312/86
Int. Cl.[4] B65D *27/00*
U.S. Cl. 229—92.3 **50 Claims**



1. A process for the production of a ready-to-mail letter form from a single sheet comprising the steps of:

a. providing a printable and foldable single sheet with a preselected window opening, said sheet having an inside major surface comprising horizontal top and bottom edges and vertical left side and right side lateral edges;

b. affixing to said major surface a see-through cover over said window opening, said cover having an inside cover surface corresponding to the inside major surface of said sheet;

c. printing information to be sent on said inside major surface;

d. printing in mirror writing addressing information on said inside cover surface;

e. folding said sheet at least once, whereby said addressing information is readable through the cover over the window opening; and

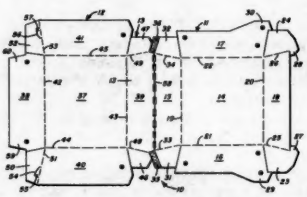
f. securing said sheet in its folded state.

4,877,178

PAPERBOARD FOLDABLE CARTON

Larry Eisman, Elkins Park, Pa., assignor to Dopaco, Inc., Downingtown, Pa.

Filed May 4, 1989, Ser. No. 347,040
Int. Cl.[4] B65D *43/08*
U.S. Cl. 229—114 **6 Claims**



1. A carton formed from a unitary blank of cut and foldable paperboard comprising:

a tray, a cover fitting over said tray, and a fold line hinge connecting said tray and cover, said tray comprising:

a bottom panel, two side walls, a rear wall and a front wall, said front wall having two glue flaps, each glue flap being adhered to one of said side walls, each glue flap having a detent in an upper portion thereof extending forwardly

and above said front wall, each side wall having a detent in an upper portion thereof extending forwardly and above said front wall, each glue flap detent and each side wall detent being in overlapped joined relation to form a pair of double thickness detents, said cover comprising:

a top panel, two side walls, a rear wall and a front wall, said front wall having a slot at each end portion thereof, said slots receiving said pair of detents when said cover is closed to lock said cover to said tray.

4,877,179

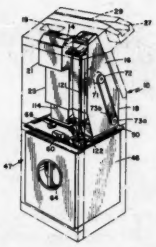
FAREBOX SECURITY DEVICE

Joseph R. Baker, San Diego; Golland, Wesley A., La Jolla; Paul A. Mullens, and Roger B. Trimble, both of San Diego, all of Calif., assignors to Cubic Western Data Corporation, San Diego, Calif.

Division of Ser. No. 114,565, Oct. 29, 1987, which is a continuation of Ser. No. 750,534, Jun. 28, 1985. This application Mar. 31, 1988, Ser. No. 176,165

Int. Cl.[4] G07B *15/00*

U.S. Cl. 232—7 **3 Claims**



1. A farebox comprising:

a housing having two separate chambers with a connecting opening communicating between said two chambers;

a fare receiving module located in a first one of said chambers and having means for receiving fares deposited in the housing, and means for transporting deposited fares to said connecting opening;

a locking device associated with the fare receiving module for releasably retaining said module in the first chamber;

a security shutter in the housing movable between a first position blocking said connecting opening and a second position in which the opening is unblocked;

a cashbox located in the second of said chambers and having at least one deposit opening communicating with said connecting opening for receiving fares deposited in said connecting opening by the fare receiving module; and

linkage means linking said security shutter to said locking device for moving said security shutter into said first position in response to unlocking of said locking device to release the fare receiving module from the housing and moving said security shutter into said second position in response to locking of said locking device to secure said module in said housing.

4,877,180

MAILBOX SIGNALLING APPARATUS

James A. Shull, P.O. Box 299, Butlerville, Ind. 47223

Filed Apr. 17, 1989, Ser. No. 338,321

Int. Cl.[4] B65D *91/00*; A47G *29/12*

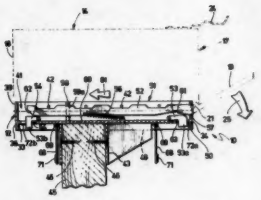
U.S. Cl. 232—35 **18 Claims**

1. Mailbox signalling apparatus for a mailbox having a front end and a back end and a closure member mounted on the front end which is adapted to be pivotally moved from a closed position to an open position, said signalling apparatus comprising:

a base for supporting said mailbox;

a first indicator member support means on said base for supporting an indicator member toward the front end of said mailbox;

a second indicator member support means on said base for supporting an indicator member toward the back end of said mailbox;



an indicator member selectively supported by one of said first or second indicator member support means for movement between a first, stand-by position and a second, signalling position; and

actuating means on said base for actuating said indicator member for movement from said first, stand-by position to said second, signalling position when said closure member is pivotally moved from a closed position to an open position.

4,877,181

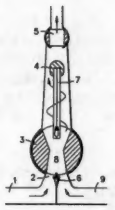
SHOWER VALVE

John V. Stewart, 1308 Henry Balch Dr., Orlando, Fla. 32810

Filed Aug. 18, 1988, Ser. No. 233,578

Int. Cl.[4] G05D *23/13*

U.S. Cl. 236—12.17 **15 Claims**



1. An apparatus for mixing two fluids of different temperatures, and controlling the resultant and total flow volume, comprising in combination:

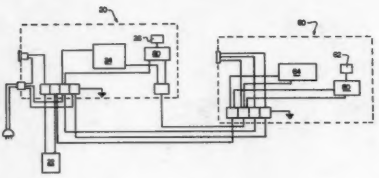
mixing-valve means for mixing two fluids in controllable proportion, having a first control shaft, and a case with two fluid inlets and an elongated fluid outlet;

a flow valve having a second control shaft, said flow valve mounted in said outlet;

first and second control levers, connected to said first and second control shafts respectively;

a control dial mounted on the exterior of said case, having a dial face with means for indicating the positions of the control levers; said control levers mounted on the exterior of said case approximately concentric with the control dial.

4,877,182
CRAWL SPACE VENTILATION SYSTEM
J. Robert Pugh, Greensboro, and James F. Matherly, Summerfield, both of N.C., assignors to Custom Industries, Inc., Greensboro, N.C.
Filed Oct. 14, 1988, Ser. No. 258,315
Int. Cl.[4] F24F 13/12
U.S. Cl. 236—44 C 6 Claims



6. A ventilation system for creating air in the dead air spaces of a structure, such as the crawl space beneath a house; said ventilation system comprising;

(a) an intake unit for pulling outside air into the area to be ventilated; said intake unit including:

(i) at least one intake ventilator for entrance of outside air to the area being ventilated;

(ii) means for opening and closing said intake ventilator responsive to temperature of outside air;

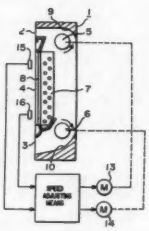
(b) an exhaust unit for exhausting air from the area being ventilated; said exhaust unit including:

(i) at least one exhaust ventilator for passage of exhaust air therethrough;

(ii) means for pulling exhaust air through said exhaust ventilator responsive to a prescribed humidity level within the area to be ventilated;

(c) means for controlling said intake and exhaust units in series relationship responsively to prescribed temperature and humidity levels such that said system cuts off when outside temperature reaches a prescribed cutoff point, automatically cycling on and off when the humidity reaches a certain level and the temperature is above said prescribed cutoff point.

4,877,183
AIR FLOW CONTROL DEVICE FOR AN AIR CONDITIONER
Kenji Matsuda; Kenji Togashi; Hiroyuki Umemura; Tetsuji Okada; Hidenori Ishioka, and Katsuyuki Aoki, all of Shizuoka, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan
Filed Sep. 19, 1988, Ser. No. 246,269
Claims priority, application Japan, Sep. 22, 1987, 62-238405
Int. Cl.[4] F24F 13/00
U.S. Cl. 236—49.3 12 Claims

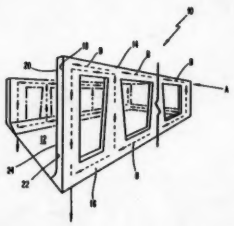


1. An air flow control device for an air conditioner having an outlet port and an intake port formed in an indoor unit main body, and having a fan motor arranged so as to face the outlet port, comprising:

detecting means for detecting information corresponding to a possibility that the outlet air blown out off an outlet port is blown into the intake port, and

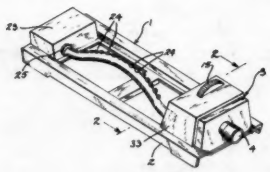
fan motor speed adjusting means for controlling the revolution of the fan motor based on the output signal from the detecting means.

4,877,184
EXHAUST HEATED TRAILER
William T. Johnston, P.O. Box 3820, Randolph, Ohio 44601
Continuation of Ser. No. 935,839, Nov. 28, 1986, Pat. No. 4,751,873. This application Jun. 20, 1988, Ser. No. 209,289
The portion of the term of this patent subsequent to Jun. 21, 2005, has been disclaimed.
Int. Cl.[4] B60H 1/02
U.S. Cl. 237—12.3 C 1 Claim



1. A container body for a vehicle powered by an internal combustion engine, said container body comprising a front wall, opposite side walls, and a bottom interconnecting said side walls and said front wall, said front wall and said side walls having gas passages extending longitudinally of said side walls from adjacent said front wall, said front wall having conduit means for receiving exhaust gases from said internal combustion engine, ambient air inlet scoops in said side walls adjacent said front wall and communicating with a one of said longitudinal passages, and fluid outlet means in said side walls communicating with said longitudinal passages at a distance remote from said front wall, whereby the introduction of hot engine gases from said vehicle through said conduit means is drawn through said longitudinal passages by ambient air flowing into said scoop means and exhausting through said fluid outlet means to heat the interior of said body.

4,877,185
OSCILLATING SPRINKLER
Fred W. Kufrin, Janesville, Wis., assignor to Western Industries Inc., Milwaukee, Wis.
Filed Dec. 31, 1986, Ser. No. 948,123
Int. Cl.[4] B05B 3/16
U.S. Cl. 239—242 18 Claims



1. An improved oscillating sprinkler, comprising a frame, a housing mounted on the frame and having a water inlet fitting

to be connected to a source of water under pressure, a sprinkler tube mounted for oscillating movement on the frame and having a plurality of water outlets, water supply means disposed within the housing for supplying water from said inlet fitting to said sprinkler tube, an output shaft driven by water flowing in said water supply means, crank arm means operably connected to the sprinkler tube to oscillate said tube through a given amplitude, a pair of elliptical gears, one of said gears being connected to said output shaft and the other of said gears being operably connected to said crank arm means, said elliptical gears being constructed and arranged so that the variable speed output of said other gear balances the variable speed output of said crank arm means to thereby oscillate said sprinkler tube with a substantially uniform velocity throughout its amplitude of oscillating movement, and slip clutch means interconnecting the sprinkler tube and the frame, said slip clutch means having a locking position to transmit oscillating movement of said crank arm means to said sprinkler tube and being constructed and arranged to permit manual rotation of said sprinkler tube relative to the frame to thereby shift the spray pattern.

4,877,186

WINDSHIELD WASHING SYSTEM, ESPECIALLY FOR MOTOR VEHICLES

Wolfgang Scholl, Gemmrigheim, Fed. Rep. of Germany, assignor to ITT SWF Auto-Electric GmbH, Bietigheim-Bissingen, Fed. Rep. of Germany

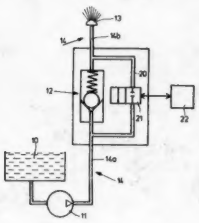
PCT No. PCT/EP87/00667, § 371 Date Jun. 30, 1988, § 102(e) Date Jun. 30, 1988, PCT Pub. No. WO88/03488, PCT Pub. Date May 19, 1988

PCT Filed Nov. 4, 1987, Ser. No. 230,831

Claims priority, application Fed. Rep. of Germany, Nov. 7, 1986, 3638074

Int. Cl.⁴ B05B *12/10*; B60S *1/46*

U.S. Cl. 239—75 **6 Claims**



1. In a windshield washing system, especially for motor vehicles, comprising a feed pipe connected at one end to at least one washing jet, and intermediately operable pump means connected to the other end of said feed pipe for pumping washing fluid through said pipe to said jet upon operation of said pump means and for maintaining washing fluid in said pipe between successive operations of said pump means; the improvement comprising control means selectively positionable in either of a first or a second position, said control means being operable in said first position to drain fluid from at least that portion of said feed pipe adjacent said one end and being operable in its second position to prevent drainage of fluid from said portion of said feed pipe.

4,877,187

UNIT INJECTOR FOR GASOLINE ENGINES

Paul D. Daly, Troy, Mich., assignor to Allied-Signal Inc., Morris Township, Morris County, N.J.

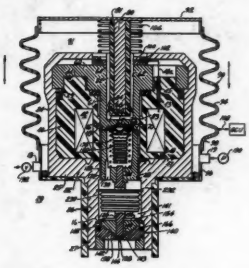
Division of Ser. No. 112,653, Oct. 23, 1987, Pat. No. 4,784,322.

This application Jul. 6, 1988, Ser. No. 215,679

The portion of the term of this patent subsequent to Nov. 15, 2005, has been disclaimed.

Int. Cl.⁴ F02M *47/02*

U.S. Cl. 239—89 **14 Claims**



1. A unit injector adapted to receive fuel from a relatively low pressure source, comprising:

a housing;

armature means responsive to an electromagnetic force for opening and closing a metering orifice to control the ejection of fuel therefrom;

a fuel receiving chamber disposed upstream of the metering orifice;

a check valve disposed upstream of the fuel receiving chamber, responsive to a pressure differential thereacross to control the flow of fuel to such chamber;

first accumulator means disposed in the fuel receiving chamber, compressible in response to the pressure of the fuel therein for pressurizing fuel upstream of the metering orifice;

an outer bellows, fluidly sealed at one end, and adapted to expand and contract as fuel is received and purged therefrom, including a flexible, springlike wall effecting to restore the outer bellows to its non-expanded size;

means defining a pressure chamber;

means movable with the outer bellows to pressurize the fuel in the pressure chamber and for urging same across the check valve, compressing the first accumulator means; and

means for generating the electromagnetic force to move the armature means away from the metering orifice.

4,877,188

DISTRIBUTION FOR FORMING A THIN LIQUID LAYER ON A SURFACE

Joseph Ritter, Tamm-Hohenstange, Fed. Rep. of Germany, assignor to Nestec S.A., Vevey, Switzerland

Filed May 27, 1988, Ser. No. 200,002

Claims priority, application European Pat. Off., Jun. 4, 1987, 2128/87

Int. Cl.⁴ B05B *1/04, 1/14, 1/24*

U.S. Cl. 239—135 **9 Claims**

1. A distribution device for forming a thin layer of liquid on a surface comprising:

a cylinder housing;

a base member comprising a plate being affixed to a first end of the cylinder housing and having a plurality of bores therethrough for distribution of the liquid;

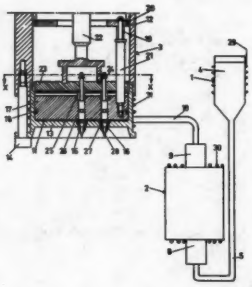
a pressure plate being affixed to a second end of the cylinder;

a freely displaceable piston disposed within the cylinder

adjacent the base plate member and connected to rods loaded by springs and anchored to the pressure plate, the displaceable piston being movable away from and towards the base plate member bores for forming a distributing chamber and having a plurality of bores corresponding in number and positioning with the base plate member bores;

a connection into the chamber for allowing liquid to be distributed into the chamber for forcing the displaceable piston away from the base plate member bores;

a support plate disposed within the cylinder between and displaced from the pressure plate and the displaceable piston and being movable to a position towards and to a position away from the displaceable piston and the base plate member bores; and



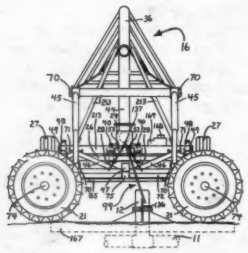
a plurality of nozzle needles affixed to the support plate corresponding in number and position with the number and position of the base plate member bores and displaceable piston bores, the nozzle needles extending through the displaceable piston bores and having a configuration and length sufficient for extending to the base plate member bores so that when the support plate is moved to a position towards the displaceable piston and base plate member bores, the base plate member bores are sealed, and for allowing, when the support plate is moved to a position away from the displaceable piston and base plate member bores, liquid to be ejected and distributed, by means of the displaceable piston, through the base plate member bores.

4,877,189

IRRIGATION SYSTEM

Christopher G. Williams, P.O. Box 1372, Spokane, Wash. 99211-1372

Filed May 18, 1987, Ser. No. 50,965
Int. Cl.[4] A01G *25/09*
U.S. Cl. 239—749 **28 Claims**



27. For use with a land irrigation system including a series of access valves spaced along a water main and a water delivery pipe mounted by carts for travel transverse to the delivery pipe length; an apparatus to successively forward an access valve coupler along the series of access valves in relation to travel of the water delivery pipe comprising:

valve coupling means for selectively connecting the water delivery pipe to the individual access valves,

a truss supported conduit span mounted to the water delivery pipe and extending therefrom to a free swinging end supporting the valve coupling means for guided transport of the valve coupling means between access valves and for flowing water between the valve coupling means and the delivery pipe,

pivot means for pivotably mounting the truss supported conduit span to the water delivery pipe,

travel means for ground supporting and moving the free swinging end of the truss supported conduit span,

valve coupler rotation means for allowing rotation of the truss supported conduit span when the free swinging end is secured by the valve coupling means to an access valve,

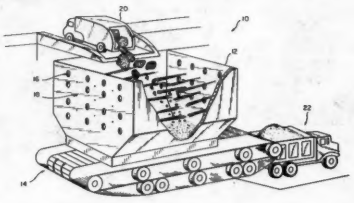
control means operative responsive to the valve coupling means and travel means for controlling the uncoupling, travel and recoupling of the valve coupling means along the series of access valves.

4,877,190

SANDBLASTED GARBAGE DISPOSAL SYSTEM AND METHOD OF USING

Cecil Lineback, Indian Head, Md., assignor to Waste Management Systems, Inc., Bethesda, Md.

Filed Jan. 4, 1989, Ser. No. 293,353
Int. Cl.[4] B02C *19/06*
U.S. Cl. 241—5 **6 Claims**



1. A process for comminuting large pieces of garage, said process comprising the steps of:

introducing large pieces of garbage into a container;

applying heat from heat lamps for removing water from said garbage;

sandblasting said garbage for reducing said garbage to particles of a size smaller than sand;

separating particles smaller than sand; and

disposing of said particles smaller than sand.

4,877,191

SHREDDING OR SLICING TOOL ARRANGEMENT FOR CUTTING FOOD MATERIAL, IN PARTICULAR FOR FOOD PROCESSORS

Jürgen Golob, Friedrichsdorf, and Wolfgang Franke, Langen, both of Fed. Rep. of Germany, assignors to Braun Aktiengesellschaft, Kronberg, Fed. Rep. of Germany

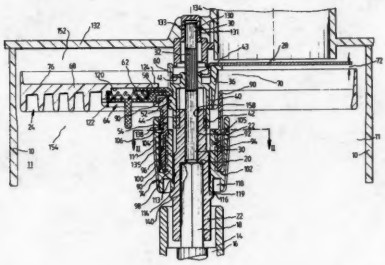
Filed May 25, 1988, Ser. No. 198,788
Claims priority, application Fed. Rep. of Germany, Jun. 4, 1987, 3718728
Int. Cl.[4] B02C *18/18*
U.S. Cl. 241—92 **11 Claims**

1. A cutting tool arrangement for cutting food material, in particular for domestic appliances, which arrangement is

adapted to be fitted in a non-rotatable relationship to a drive shaft extending through the bottom of a bowl comprising

a shaft coupling, a disk adapted to divide the bowl into an upper and a lower bowl section, said disc having an opening, a cutting tool provided in said opening of said disk, and an adjusting device for adjustment of the position of said disk relative to said cutting tool,

said adjusting device being rotatably mounted and fixed in



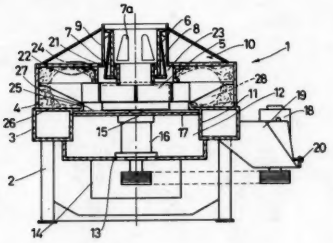
axial longitudinal direction on said shaft coupling while at the same time being connected with said disk via coupling structure that includes elongated toothed structure such that said shaft coupling is in driving relation with said disk and said cutting tool via said elongated toothed structure, and that said cutting tool bears against the drive shaft in axial direction and is held in a fixed position relative to said drive shaft while said adjusting device adjusts the position of said disk relative to said cutting tool.

4,877,192

ROTARY IMPACT CRUSHER MAIN WEAR TIP

Pieter J. Rossouw, and Jan H. Rossouw, both of 31 Newton Road, Uraniaville, Klerksdorp, Transvaal Province, South Africa

Filed Jun. 6, 1988, Ser. No. 203,304
Int. Cl.[4] B02L *1/10*
U.S. Cl. 241—275 **8 Claims**



1. A main wear tip for an outlet of a rotary impact crusher rotor comprising:

a backing plate having a forward end;

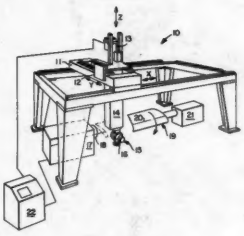
a wear resistant assembly secured to the backing plate forward end forming an inwardly directed step which is with respect to the rotor outlet, the step having sufficient size to cause autogenous build up of material being crushed behind the step and to form a protecting lining against an inner wall of the rotor, the wear resistant assembly including a carrier block from which projects hard metal tips.

4,877,193

REDIRECT ROLLER APPARATUS FOR FIBER PLACEMENT MACHINE

Milo M. Vaniglia, Southgate, Ky., assignor to Cincinnati Milacron Inc., Cincinnati, Ohio

Filed Aug. 25, 1988, Ser. No. 236,417
Int. Cl.[4] B21F *17/00*; B32B *31/00*
U.S. Cl. 242—7.21 **1 Claim**



1. In a fiber placement machine, having a band of fibers oriented with its length running along a path with respect to a relatively stationary machine member, the band of fibers being ultimately paid-out to a fiber application surface, an improved fiber guidance system comprising:

a fiber supply creel including plural spools of fiber mounted to said relatively stationary machine member said fiber supply creel also including means for maintaining tension on said fibers;

a manipulator wrist affixed to said relatively stationary machine member;

a fiber placement head affixed to said manipulator wrist, and having a fiber payout zone, said head capable of being manipulated through a variety of spatial orientations by said manipulator wrist, especially at least two-dimensional spatial orientations with respect to said relatively stationary machine member;

a plurality of fiber redirect rollers, having roller elements rotatable about a first roller axis with respect to a roller base, and

wherein said roller base includes a bearing member for providing rotary movement of said base about a base axis transverse to the roller axis as said fiber placement head is manipulated, and

wherein at least a first redirect roller is affixed to said relatively stationary machine member and at least a second redirect roller is affixed to said fiber placement head, and

wherein a band of fibers is trained around said first and second redirect rollers under tension, and said redirect rollers will cooperatively swivel about their bases in accordance with spatial orientation of the placement head and in accordance with tension of the fiber band, thereby maintaining approximately equal tension at the outer fibers at each side of the fiber band, while guiding said fiber band.

4,877,194

METHOD FOR PREVENTING DEFECTIVE SPLICING FOR AUTOMATIC WINDERS

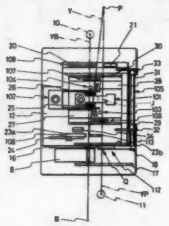
Isamu Matsui, Kyoto; Kenji Ohashi, Uji, and Koji Deno, Oumihachiman, all of Japan, assignors to Murata Kikai Kabushiki Kaisha, Kyoto, Japan

Filed Apr. 20, 1988, Ser. No. 183,977
Claims priority, application Japan, Apr. 22, 1987, 62-99447; Apr. 30, 1987, 62-106878; Nov. 12, 1987, 62-284297
Int. Cl.[4] B65H *54/22*; D01H *15/00*
U.S. Cl. 242—35.6 R **20 Claims**

1. A method for preventing defective splicing in an automatic winder in which two ends of cut yarns are spliced after

being guided into a yarn splicing device and then a winding operation is re-started, the method comprising the steps of:

clamping a superfluous yarn portion branching off from the joint of the spliced yarn; and



starting a drum to cause a package to start winding after the superfluous yarn portion is clamped.

4,877,195

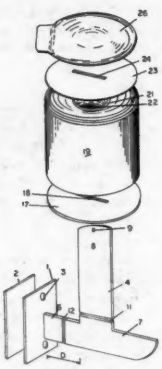
ROLLED WEB HOLDER

Charles A. Smith, 3404 Winchester Rd., Louisville, Ky. 40207

Filed Oct. 17, 1988, Ser. No. 258,874

Int. Cl.[4] B65D *85/67*; B65H *19/00*

U.S. Cl. 242—55.2 **1 Claim**



1. A holder for a web material wound onto a hollow generally cylindrical core including a base member for attachment to supporting base means with a generally "T" shaped bracket extending laterally therefrom where the bracket is planar and includes a leg base attached to the base member and a laterally extending arm member of selected width, a first generally planar support having an aperture therein generally conforming to the cross sectional periphery of the arm member to be received thereon and rest on the leg base where the width of the arm is generally equal to the diameter of the core of the web of material, and a second cover member having a geometric configuration generally congruent to the geometric configuration of the outer periphery of the web of material having an opening therein having a geometric configuration generally similar to the geometric configuration of the periphery of the cross section of the arm member.

4,877,196

RIDER ROLLER FOR A ROLL FORMED IN A WEB-WINDING MACHINE

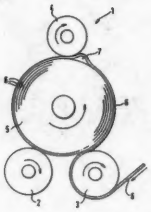
Willi Heymanns, Kaarst, Fed. Rep. of Germany, assignor to Jagenberg Aktiengesellschaft, Dusseldorf, Fed. Rep. of Germany

Filed Jun. 10, 1988, Ser. No. 206,010

Claims priority, application Fed. Rep. of Germany, Jun. 10, 1987, 3719282

Int. Cl.[4] B65H *18/20*

U.S. Cl. 242—66 **16 Claims**



1. A web-winding machine comprising:

at least one support roller;

a roll of a web resting upon said support roller and adapted to be wound up by rotation by contact with said support roller;

means for feeding said web to said support roller for winding in said roll; and

at least one rider roller resting against said roll and contacting said web only after said web has been wound on said roll and wherein said rider roller is nonsupporting of said roll and is located across said roll from a region at which said web first meets the roll said rider roller having a web-engaging surface formed with a multiplicity of grooves.

4,877,197

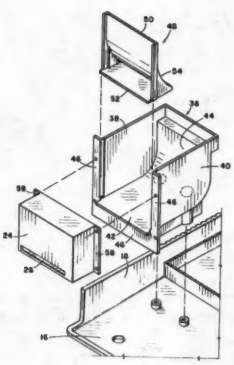
INSTRUMENT HOUSING WITH IMPROVED PAPER FEED

John R. Nelson, Oviedo, and Thomas F. Lehman, Winterpark, both of Fla., assignors to Invivo Research, Inc., Broken Arrow, Okla.

Filed Jul. 22, 1988, Ser. No. 223,447

Int. Cl.[4] B65H *19/00*; B41J *15/00*

U.S. Cl. 242—68.7 **1 Claim**



1. An instrument housing having improved means for stor-

ing a roll of paper of selected width and maximum diameter for use by a printer comprising:

an instrument housing formed of thin-wall, stiff material such as plastic or metal and having a front and a top, the top having a generally rectangular opening therein adjacent the housing front and the front having a generally rectangular opening therein forward of and below said opening in said top;

a trough positioned within said instrument housing below said opening in said top and rearwardly of said opening in said front, the trough having an open top and front and having opposed paralleled side walls, and a rearward wall and bottom wall which merge into a quarter circular integral intersection, the radius of curvature of the intersection being about one-half of the maximum diameter of the paper roll for which the trough is dimensioned to receive and the spacing between said side walls being slightly greater than the width of paper roll the trough is dimensioned to receive;

a trough gate receivable by said trough and forming a front wall therefor, the trough gate being of a width substantially equal to the width between said trough sidewalls, the trough gate having a downwardly extending inner surface curved at the lower portion thereof towards said trough back wall at a radius of curvature substantially equal to said radius of curvature of said intersection of said trough rearward and bottom wall, and the trough gate having a bottom wall spaced slightly above said trough bottom wall providing a slot therebetween whereby when a roll of paper is positioned within said trough the free end of the paper may exit said trough through said slot; and

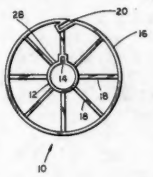
an electrically actuated printer mechanism positioned in said housing forwardly of said trough gate and closing said housing front opening, the printer having means to receive paper from and for pulling paper through said slot as the printer functions.

4,877,198

DEVICE FOR GROUNDING CONDUCTIVE FILM

Moshe Gershenson, Mohegan Lake, N.Y., and Mark L. Moskowitz, Wayne, N.J., assignors to GAF Corporation, Wayne, N.J.

Filed Aug. 3, 1988, Ser. No. 228,133
Int. Cl.[4] B65H *75/28*
U.S. Cl. 242—74 **13 Claims**



1. A device for supplying a film having an electrically conductive layer comprising:

(a) a spool adapted for mounting on a rotatable grounded spindle for rotation therewith;

(b) retaining means for securing the trailing edge of an electrically conductive film wound on the spool;

(c) conductive means for electrically connecting the spool to said grounded spindle; and

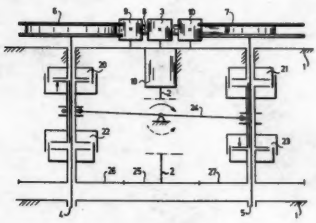
(d) contact means mounted on the trailing edge of the film for maintaining electrical contact between the conductive layer of the film and the conducting means during unwinding of the film from the spool.

4,877,199

TAPE-CONVEYING SYSTEM FOR FORWARD AND BACKWARD PLAYING MAGNETIC TAPE RECORDER AND/OR PLAY-BACK UNIT

Gábor Nagy; György Neumann; Márta Kovács, and András Strömpl, all of Budapest, Hungary, assignors to BRG Mechatronikai Vallalat, Hungary

Filed Apr. 27, 1988, Ser. No. 186,958
Int. Cl.[4] G11B *15/18*
U.S. Cl. 242—201 **17 Claims**



1. A tape transport system comprising:

(a) a frame;

(b) a variable speed, reversible drive mechanism comprising a motor;

(c) two winding shafts;

(d) a winding clutch associated with each of said winding shafts;

(e) a secondary mechanism that connects each winding clutch with said drive mechanism;

(f) an unwinding clutch associated with each of said winding shafts, each of said unwinding clutches connected to said frame; and

(g) an actuation means, said actuation means engaging one winding clutch and one unwinding clutch, wherein the two engaged clutches are each on a different winding shaft, or alternately the opposite such pair and wherein the clutch engagements are such that the motions, if any, of the winding shafts are compatible with the motions, if any, of the drive mechanism so as to provide proper tape tensioning.

4,877,200

CINE CAMERA EMPLOYING INTERCHANGEABLE FILM MAGAZINES WITH DISPLACEMENT OF THE SPINDLES OF THE FILM TAKE-OFF AND TAKE-UP REELS

Jean-Pierre Beauviala, Grenoble, France, assignor to Aaton, R.G., Grenoble, France

Filed Apr. 22, 1988, Ser. No. 185,077
Claims priority, application France, Apr. 28, 1987, 87 06000
Int. Cl.[4] G03B *1/04*
U.S. Cl. 242—205 **10 Claims**

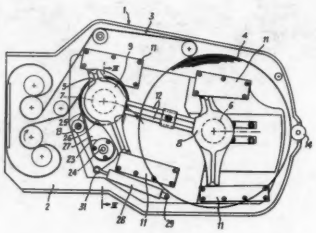
1. A cine camera for use with interchangeable film magazines having a casing therein, displaceable spindles for a film take-off reel and for a film take-up reel, and connection means for rendering the spindles fast in translation, each said interchangeable film magazine having a wall with an outer face, comprising:

an electric motor mounted on the body of the camera, and said electric motor being coupled with a horizontal driven shaft fast with a driving magnetic plate of a magnetic coupler housed in an opening in said camera body and having an axis coaxial with the axis of the motor and the axis of said shaft, and said camera body having an outer face;

said driving magnetic plate having an outer front face which is substantially flush with the outer face of said camera body, said outer face of said camera body being fast with

said take-up reel and said spindle thereof adjacent to the outer face of the wall of the casing of said interchangeable film magazines;

said magnetic coupler comprising a driving pinion, a driven magnetic plate in said magazine, said driven magnetic plate having an axis merging with the axis of said driving magnetic plate, said driven magnetic plate being fast with said driving pinion, said driven magnetic plate and said driving pinion being mounted to rotate in said magazine about an axis which is merged with the axis of said drive motor;



a driven pinion, coupled with said driving pinion and being coaxial therewith, said driven pinion being fast with the take-up reel spindle; and

means mounting said take-up reel spindle and said driven pinion to rotate jointly on a pivot plate, a driven plate forming with said driving pinion a driven plate-driving pinion assembly, and said pivot plate being mounted to pivot about the axis of the driven plate-driving pinion assembly.

4,877,201

BALLISTIC PROJECTILES

Brian T. Trayner, Stevenage, United Kingdom, assignor to British Aerospace Public Limited Company, London, England

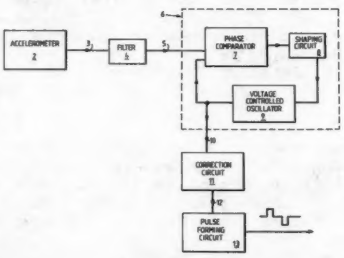
Continuation of Ser. No. 80,234, Jul. 28, 1987, abandoned, which is a continuation of Ser. No. 883,725, Jul. 9, 1986, abandoned.

This application May 31, 1988, Ser. No. 201,324

Claims priority, application United Kingdom, Jul. 10, 1985, 8517464

Int. Cl.[4] F42B *15/02*

U.S. Cl. 244—3.21 **11 Claims**



1. A method of determining a position of a vertical plane extending through a spin axis of a spinning ballistic projectile in flight, the method comprising the steps of:

obtaining signals corresponding to an acceleration experienced along a sensitive axis parallel to but spaced from the spin axis, said signals containing periodic and non-periodic terms, the periodic term being related to the spin frequency,

processing said signals to isolate the periodic term, and

ascertaining the phase of said signal with reference to a reference phase so that an indication of the vertical plane is obtained.

4,877,202

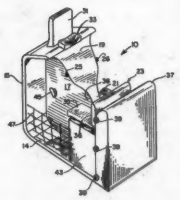
PRONATED ESCAPE SYSTEM FOR FIGHTER AIRCRAFT

Allen D. Disselkoen, Jr., Dayton, Ohio; Robert F. Gargiulo, Bedford, Mass.; James E. Haywood, Redlands, Calif.; Keith H. Heise, Huber Heights, Ohio; Darrell H. Holcomb, Helotes, Tex.; Stuart C. Kramer, Beavercreek, Ohio; Gregory R. Miller, Roy, Utah; Jeffrey S. Nicholson, Albuquerque, N. Mex.; Jeffrey J. Olinger, Tijeras, N. Mex., and Curtis H. Spenny, Bellbrook, Ohio, assignors to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Nov. 23, 1988, Ser. No. 277,576

Int. Cl.[4] B64D *25/10*

U.S. Cl. 244—122 A **5 Claims**



1. An ejectable seat system for an aircraft cockpit, comprising:

(a) a platform supporting at a rearward end thereof a seat having a seat back and seat pan sized and configured for receiving an occupant of said cockpit;

(b) said platform supporting at a forward end thereof a generally upwardly extending cowling substantially integral with said platform and faired therewith for providing windblast protection to said occupant upon ejection from said cockpit;

(c) an upright wall member disposed on said platform generally centrally thereof and extending between said seat and said cowling, said wall member supporting an inclined chest plate extending generally from said seat pan to an upper end of said cowling for supporting the chest of said occupant in a forward leaning position within said cockpit;

(d) a shield disposed on said cowling near an upper end of said plate for shielding the head of said occupant upon ejection from said cockpit; and

(e) harness means for releasably holding said occupant in said forward leaning position against said plate upon ejection from said cockpit.

4,877,203

METHOD AND APPARATUS FOR DISPERSING CREMATED REMAINS

Bonnie J. Harden, 3279 Silverthorne Dr., Fort Collins, Colo. 80526

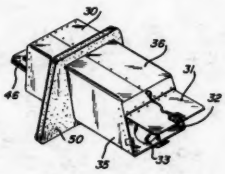
Filed Sep. 18, 1987, Ser. No. 98,500

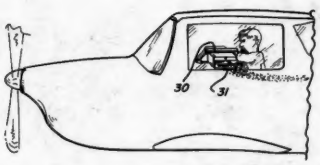
Int. Cl.[4] B64D *1/16*

U.S. Cl. 244—136 **21 Claims**

1. An apparatus for dispersing cremated remains comprising:

a. a sealable container having an outlet from which said cremated remains may be dispersed;
b. a means for opening said container;





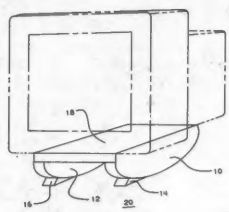
c. a means for preventing retention of any cremated remains within said container; and
d. a means for directing air into said container at said outlet.

4,877,204

TILT/SWIVEL DISPLAY BASE

Joseph A. Gregory, Kingston, and David L. Schaum, Woodstock, both of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Continuation-in-part of Ser. No. 260,979, Oct. 21, 1988, abandoned. This application Apr. 5, 1989, Ser. No. 333,740
Int. Cl.[4] A47D *19/04*
U.S. Cl. 248—298 **10 Claims**



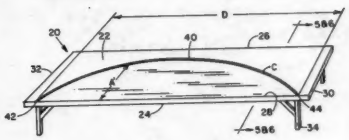
1. A support apparatus for movably mounting a product, said apparatus comprising:
at least one rocker member connectable along its top to the bottom of said product the bottom of said rocker member having an arcuate profile between an end of the rocker member nearest the front of said product and an end of the rocker member nearest the back of said product,
friction means for holding the rocker member in a selected position, wherein said friction means is generally triangular in shape having a first surface in frictional contact with said rocker member and a second surface in frictional contact with a support surface;
constant force tension means connected to said rocker member and to said friction means to maintain said frictional means in frictional contact with said rocker member and said support surface;
and oriented so that the bottom of said rocker member is in contact with said support surface.

4,877,205

HIGH-ALTITUDE BALLOON AND METHOD AND APPARATUS FOR MAKING IT

James L. Rand, San Antonio, Tex., assignor to Winzen International, Inc., San Antonio, Tex.

Filed Dec. 28, 1987, Ser. No. 138,586
Int. Cl.[4] B64B *1/58*
U.S. Cl. 244—31 **21 Claims**



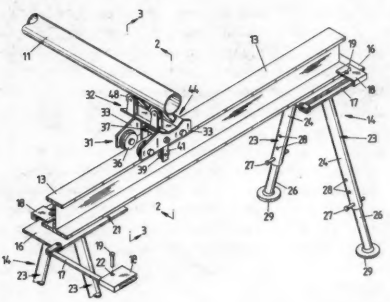
21. A balloon assembly table for making high-altitude balloons with gores cut and shaped from an assymetrical gore pattern comprising:
a flat surface upono which material for said gores may be laid, folded, and secured;
a means for cutting and sealing said gores along a straight edge, thereby forming a seam, said means for cutting and sealing forming a first edge of said asymmetrical gore pattern;
an index line for aligning each of said seams along a curved path, thereby forming a second edge of said asymmetrical gore pattern.

4,877,206

CONCRETE DELIVERY TROLLEY

Lamar Barrett, 108 Pine Cone Cir., Clanton, Ala. 35045

Filed May 23, 1988, Ser. No. 197,210
Int. Cl.[4] F16L *3/00*
U.S. Cl. 248—49 **15 Claims**

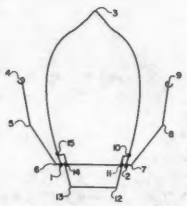


1. Apparatus for movably supporting a conduit for delivering a concrete slurry at a construction site comprising:
(a) a support beam extending transversely of the longitudinal axis of said conduit at a predetermined height;
(b) a carriage member supported for movement along said support beam;
(c) a cradle member carried by said carriage member and having a plurality of roller-like members therein for engaging said conduit such that said conduit, cradle member, and carriage member are movable concomitantly along said support beam responsive to force exerted thereon substantially parallel to said beam; and
(d) means for adjusting the height of said beam including a plurality of legs of selectable length and a beam engaging member.

4,877,207
DEVICE FOR CARRYING BAGS, PARTICULARLY REFUSE BAGS

Victor Farah, 64-70 av. André Morizet, F-92100 Boulogne, France

PCT No. PCT/FR87/00067, § 371 Date Jan. 6, 1988, § 102(e) Date Jan. 6, 1988, PCT Pub. No. WO87/05579, PCT Pub. Date Sep. 24, 1987
PCT Filed Mar. 11, 1987, Ser. No. 128,011
Claims priority, application France, Mar. 12, 1986, 86 03478; Mar. 2, 1987, 87 02786
Int. Cl.[4] A63B *55/04*
U.S. Cl. 248—97 14 Claims



1. A device for supporting bags of various dimensions to convert them into baskets, particularly for refuse, providing support of one or more bags and other objects at the same time, which comprises:

(a) a first support vertically disposed comprising two arms forming an angle having the shape of an upturned V, said arms being rounded close to the angle at the base of the V and having at their ends means through which a shaft of a second support member can pivot, said angle receiving around it a handle of one side of the bag to be supported and also serving for suspending the device to a hanger;

(b) the second support member which comprises said shaft presenting at its ends two arms to form a wide open U, said arms of the second support member being flexible and having at their ends supporting means for the opposite side of the bag, pivoting of said second support member allowing said supporting means to hold the walls of the bags at different locations permitting the size and shape of the bag opening to vary; and

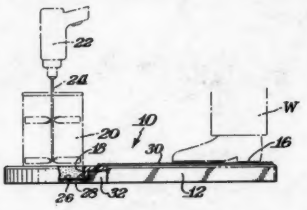
(c) a third support member comprising a folding base which rotates on the shaft of said second support member, said folding base having locking means adapted to co-act with the first support member to lock together said folding base and said first support member, allowing the device to be stood on the ground, the second support member being freely pivotable therebetween, said folding base being able to be unlocked and unfolded to allow accommodation of bags of greater heights.

4,877,208
SUPPORT FOR MIXER BUCKETS

Edsel Kennard, Jr., 310 Shipley Rd., Apt. 112, Wilmington, Del. 19809

Filed May 31, 1988, Ser. No. 200,237
Int. Cl.[4] A47G *23/02*
U.S. Cl. 248—146 8 Claims

1. A support for a mixer bucket comprising a raised platform, said platform having a bucket support section, an annular recess in said bucket support section whereby a mixer bucket of circular cross section may be inserted into said recess, said recess having a bottom and a peripheral side wall, resistance means in said recess for engagement with the bucket to maintain the bucket stationary while the contents of the bucket are being mixed, and said resistance means comprising non-skid

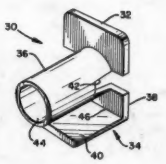


material mounted to said bottom and around said peripheral side wall of said recess.

4,877,209
DECORATIVE LIGHT PEDESTAL

Lonnie F. Gary, Lubbock, Tex., assignor to Gary Products Group, Inc., Lubbock, Tex.

Continuation-in-part of Ser. No. 257,392, Oct. 13, 1988, abandoned. This application Jan. 6, 1989, Ser. No. 294,268
Int. Cl.[4] A47F *5/00*
U.S. Cl. 248—205.3 2 Claims



1. A decorative light pedestal adapted to receive and maintain the socket portion of a decorative bulb socket assembly and bond said pedestal to a support surface, said pedestal comprising a base member having a substantially planar mounting service; a circumferential socket support member extending outwardly from said base member on the side of said base member that is opposite said mounting surface; and adhesive means adapted to bond said mounting surface of said pedestal to said support surface;

said pedestal further comprising a first void extending axially through the circumferential support member and the plane of the base member to permit said socket assembly to be inserted into the circumferential support member through said base member, and a second void adapted to receive and accommodate the passage of wiring connected to said socket assembly through said circumferential support member after said socket assembly is inserted therein;

said base member further comprising spaced apart sections which cooperate to define the plane of said mounting surface.

4,877,210
POT HANGER

Manfred F. Missalla, 52 Shieldmark Crescent, Thornhill, Ontario, Canada (L3T 3T5)

Filed Jan. 26, 1989, Ser. No. 301,490
Claims priority, application Canada, Apr. 26, 1988, 565121
Int. Cl.[4] A47H *1/10*
U.S. Cl. 248—318 1 Claim

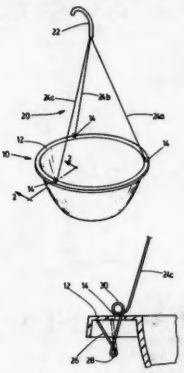
1. A hanger for pots of the type having a plurality of openings spaced around a perimeter and comprising:

a suspension member;

a plurality of wires, said wires being connected at one end of their ends to said suspension member;

a finger formed on the other end of each said wire, each said finger being bent at an acute angle to said wire;

a generally circular loop formed at the junction between said wire and said finger, said finger extending from one side of said wire to the opposite side of said wire, said loop being



resiliently flexible permitting said finger to flex inwardly against said wire, flexing of said wire and said finger towards one another causing partial expansion of said loop whereby to facilitate insertion of said wire said finger and said loop through a said opening, and,

a stop portion formed in said wire spaced from said finger, said stop portion being incapable of passing through said opening.

4,877,211

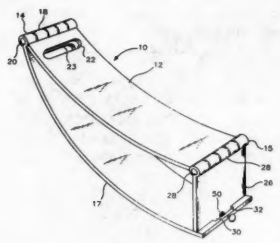
RECREATIONAL VEHICLE LEVELING DEVICE

Paul I. Orr, 4039 Enero Way, San Diego, Calif. 92154

Filed Feb. 21, 1989, Ser. No. 313,061

Int. Cl.[4] B66F 7/00

U.S. Cl. 248—352 **2 Claims**



1. A recreational vehicle leveling device comprising:

an elongated wheel receiving plate having a predetermined curvature along its longitudinal axis, said wheel receiving plate having a front end and a rear end, a plurality of laterally spaced curved hinge fingers formed on said front end, a plurality of laterally spaced curved hinge fingers formed on said rear end;

an elongated terrain engaging plate having a predetermined curvature along its longitudinal axis, said terrain engaging plate having a front end and a rear end, a plurality of laterally spaced curved hinge fingers formed on said front end;

means for connecting the respective hinge fingers on the front ends of said wheel receiving plate and said terrain engaging plate to form a first hinge assembly;

a rear spacer plate having a top end and a bottom end, a plurality of laterally spaced curved hinge fingers formed on said top end, a tongue member extends downwardly from the bottom end of said rear spacer plate and it has an aperture therein;

means for connecting the respective hinge fingers on the rear end of said wheel receiving plate and on the top end of said rear spacer plate to form a second hinge assembly; and

means for detachably securing the bottom end of rear spacer plate to the rear end of said terrain engaging plate comprising; a transversely extending slot formed in said elongated terrain engaging plate adjacent its rear end, a bore hole is also formed in the end of said elongated terrain engaging plate and said bore hole communicates with said slot, a pin having a head and a shank is inserted into said bore hole, a coil spring is slipped over the shank of said pin and a shoulder member is attached to said shank to capture one end of said spring, said pin having a tip that passes through the aperture in the tongue of said spacer plate to form a rigid leveling device structure, to disengage the bottom end of said spacer plate it is merely necessary to pull the head of said pin which will allow the tip to be removed from the bore hole in said tongue and the respective members of said leveling device can be folded into a compact stack.

4,877,212

DOCUMENT STAND

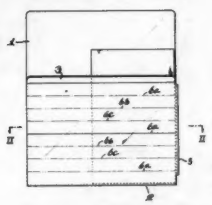
Mitsuo Kobayashi, Kawasaki, Japan, assignor to Nippo Kabushiki Kaisha, Yokohama, Japan

Continuation of Ser. No. 80,177, Jul. 31, 1987, abandoned, which is a continuation of Ser. No. 835,719, Mar. 3, 1986, abandoned. This application Oct. 31, 1988, Ser. No. 267,633

Claims priority, application Japan, Mar. 2, 1985, 60-65826[U]

Int. Cl.[4] B41J 11/02

U.S. Cl. 248—444.1 **4 Claims**



1. A document stand for a word processor or the like comprising;

a. a main rectangular plate having a first side edge and a first bottom edge;

b. a transparent rectangular plate having a second side edge and a second bottom edge, said first and second bottom edges being connected to form a first document support, said first and second side edges being connected to form a second document support, and said transparent plate being connected in stationary spaced relation to said main plate solely by said first and second document supports such that remaining non-connected two sides of each of said main plate and said transparent plate form an L-shaped opening to allow a document to be inserted therethrough in a predetermined fixed relationship with respect to at least one of said first and second document supports, said main rectangular plate and said transparent rectangular plate forming a document holder;

c. a plurality of stationary reference indica fixed on a substantially whole surface of said transparent plate, each of

said plurality of stationary reference indicia being in parallel to said first document support and vertical to said second document support to emphasize a plurality of sentences on said document and to prevent misreading or omission of a portion of said sentences of said document; and

d. a support arm to hold said document holder in a variety of positions as desired such that said document holder can be rotated,

wherein said first document support being adapted to work as bottom support for a document in which said sentences are printed horizontally and said second document support being adapted to work as a bottom support for a document in which said sentences are printed vertically.

4,877,213

CONFERENCE EASEL

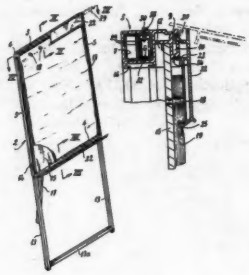
Joël Lambert, Virieu sur Bourbre, France, assignor to Solyfob Fonctions, Isere, France

Filed Jan. 29, 1988, Ser. No. 149,753

Claims priority, application France, Jan. 29, 1987, 87 01381

Int. Cl.[4] A47G *1/06*

U.S. Cl. 248—451 **12 Claims**



1. A conference easel, comprising:

a tubular frame comprising a pair of opposite generally vertical frame sections, a pair of generally horizontal upper and lower frame sections, and corner members interconnecting said frame sections, all of said frame sections being formed as identical profile elements having a main tubular portion and projecting perpendicular from said main tubular portion, a tubular panel-receiving portion having an edge remote from said main tubular portion; portion and panel-engaging means on a face of said panel-receiving portion extending parallel to said main tubular portion;

legs supporting said tubular frame and operatively connected therewith;

a panel enclosed by said frame and engaged in said panel-engaging means of said sections; and

at least one elongated flap pivotally connected to the said edge of a respective one of said horizontal frame sections and swingable between two stable positions including a position wherein said flap forms generally an extension of the respective panel-receiving portion reaching away from the respective main tubular portion and a position wherein said flap lies generally perpendicular to the respective panel-receiving portion.

4,877,214

HOLDING DEVICE OF MIRROR ELEMENT FOR REARVIEW MIRROR

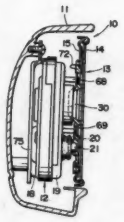
Kikuchi Toshiaki; Toshihiro Mochizuki; Yasutoshi Ito, and Tohru Yamana, all of Shizuoka, Japan, assignors to Murakami Kaimeido Co., Ltd., Shizuoka, Japan

Filed Jan. 12, 1988, Ser. No. 143,447

Claims priority, application Japan, Jan. 13, 1987, 62-2359

Int. Cl.[4] A47G *1/24*

U.S. Cl. 248—483 **11 Claims**



1. A holding device of a mirror element for a rearview mirror, comprising:

a mirror element having a mirror plate and a mirror holder supporting said mirror plate, said mirror holder having a central area, an aperture portion formed at said central area, and an undercut, said mirror element having an angle of incline that is adjustable;

actuator unit means for adjusting said angle of incline of said mirror element;

supporting means formed at said actuator unit means for tiltable supporting said mirror element;

pivot means mounted on said actuator unit means by said supporting means and mounted separately on said aperture portion, said pivot means having a pivot plate with an upper portion and a lower portion;

hook type latch means for engaging said mirror holder with said upper portion of said pivot plate;

pawl engaging means for engaging said undercut of said mirror holder with said lower portion of said pivot plate; and

said mirror holder being formed with a cutout for inserting a separating tool at a skirt of a peripheral edge thereof and with a contacting surface to be contacted with an end of said separating tool.

4,877,215

MANUFACTURING FRAMEWORK FOR USE IN MANUFACTURING A COSMETIC-PUFF

Yoshihiro Marume, and Tadao Iwamoto, both of Hiroshima, Japan, assignors to Nishikawa Rubber Co., Ltd., Hiroshima, Japan

Division of Ser. No. 129,556, Dec. 7, 1987. This application Jul. 7, 1988, Ser. No. 216,467

Int. Cl.[4] B29C *33/00*

U.S. Cl. 249—109 **6 Claims**

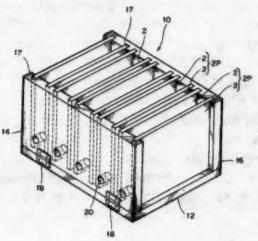
1. A manufacturing framework for a cosmetic puff comprising:

a bottom plate;

a pair of side plates pivotally mounted to said bottom plate, each side plate having a plurality of grooves formed on an inside surface thereof, one of said side plates includes a plurality of inlet ports formed at a lower portion of said side plate; and

a plurality of crimp pattern plates arranged in a vertical parallel relationship with one another on said bottom plate with both side ends of each plate being received in the grooves of said side plates, each crimp pattern plate having a crimp pattern formed surface, each pair of the crimp

pattern plates being spaced at a distance equal to a thickness of the cosmetic puff to be manufactured the crimp



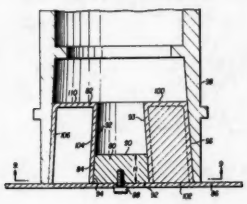
pattern formed surfaces of adjacent crimp pattern plates facing each other.

4,877,216

AUTOMATICALLY-RELEASABLE PIPE-ATTACHMENT DEVICE

Gerold J. Harbeke, 2443 Waterside Cir., Lakeworst, Fla. 33461

Continuation-in-part of Ser. No. 116,175, Nov. 3, 1987, Pat. No. 4,804,160, which is a continuation of Ser. No. 92,337, Sep. 1, 1987. This application Jun. 6, 1988, Ser. No. 202,292
The portion of the term of this patent subsequent to Feb. 14, 2006, has been disclaimed.
Int. Cl.[4] E04G *15/06*
U.S. Cl. 249—207 **11 Claims**



1. Pipe-attachment apparatus for attaching an elongated pipe to a concrete form wall, with an axis of said pipe extending laterally away from said form wall, said apparatus including:

a first attachment means for being attached to said concrete form wall and extending axially away from said form wall, laterally to said form wall, said first attachment means having an outwardly, radially directed, outer surface for helping to support said pipe on said concrete form wall;

a second attachment means separate from said first attachment means and said pipe, said second attachment means defining a radially outwardly directed surface for tightly contacting a radially inwardly directed, internal surface of said pipe to have frictional engagement therewith, thereby helping to support said pipe on said concrete form wall, said second attachment means contacting only said radially inwardly directed internal surface of said pipe, said second attachment means radially outwardly directed surface being tapered radially inwardly away from said concrete form wall when said second attachment means is mounted on said first attachment means, said second attachment means defining a cavity extending axially, laterally away from said concrete form wall for substantially completely receiving said first attachment means, said cavity defining a radially inwardly directed surface corresponding to said radially outwardly directed outer surface of said first attachment means;

said radially outwardly directed outer surface of said first attachment means and said radially inwardly directed cavity surface of said second attachment means being of approximately the same size for fitting tightly together but allowing sliding axial movement between them without damaging either member;

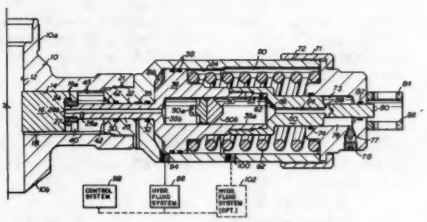
means for attaching said first attachment means to said concrete form wall to permit sliding axial movement between said first attachment means and said cavity surface thereby aiding in supporting said pipe on said concrete form wall during a pouring of concrete, but after the concrete is cured allowing the form wall to be removed in an axial direction with said first and second attachment means sliding away from one another leaving the first attachment means on the concrete-form wall and the second attachment means on said pipe.

4,877,217

FAIL-SAFE BLOWOUT PREVENTER

Archie W. Peil, and Thomas R. Bishop, both of Houston, Tex., assignors to Bowen Tools, Inc., Houston, Tex.

Filed Oct. 27, 1988, Ser. No. 263,519
Int. Cl.[4] F16K *31/00*
U.S. Cl. 251—1.3 **20 Claims**



7. A fail-safe blowout preventer, comprising:

a preventer body having a ram bore for guiding a ram between an open and a closed position;

means for allowing fluid within the ram bore to bypass the ram;

a ram shaft having an inner end and an outer end, the cross-sectional area of the inner end being smaller than the cross-sectional area of the outer end, and the cross-sectional area of the outer end being smaller than the cross-sectional area of the ram;

means for allowing fluid within the ram bore to exert a force upon the cross-sectional area of the outer end of the ram shaft for urging the ram to the closed position; and

means for opposing movement of the ram from the open to the closed position until an external signal is received.

4,877,218

DRAIN VALVE DEVICE

Clayton S. Kasner, North Canton, Ohio, assignor to Design Improvement Corporation, Akron, Ohio

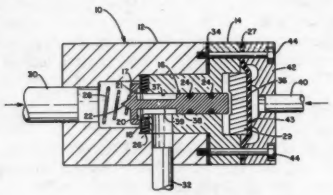
Continuation-in-part of Ser. No. 863,366, May 15, 1986, abandoned. This application Apr. 29, 1988, Ser. No. 188,352
Int. Cl.[4] F16K *31/126*
U.S. Cl. 251—61.3 **7 Claims**

1. A drain valve device, comprising:

a valve with a stem-mounted valve disc activated between opened and closed positions by longitudinal movement of the stem and corresponding movement of the valve disc against and away from a valve seat, said valve seat comprising a replaceable, pressure deformable, resilient annular disc having an opening therein through which a flow of material may axially pass, and said valve disc having an inner surface facing said valve seat, said inner surface

being recessed to provide a peripheral land on said inner surface, thereby limiting an area of contact between said valve seat and valve disc in the valve's closed position to the surface area of the land;

a valve actuator mounted on said valve and adapted to exert a force on said stem, thereby moving the stem and forcing said disc away from said valve seat and thus opening the valve, wherein said valve is equipped with a spring to return it to its closed position when said force is removed; and



wherein said valve disc has a pointed tapered cone extending from a center of a surface of said disc opposite said valve seat, said pointed tapered cone being axially aligned with said annular disc, with a pointed end of said cone positioned upstream of said flow of materials to said annular disc, and wherein said spring is conical in shape and is positioned within said valve so that its smaller end is seated against said cone.

4,877,219

PIPE FITTING

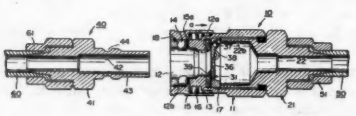
Kazuo Yano, Tokyo, Japan, assignor to Thyme Tech Co., Ltd., Tokyo, Japan

Filed Oct. 20, 1988, Ser. No. 260,031

Claims priority, application Japan, Oct. 20, 1987, 62-159252

Int. Cl.[4] F16L *37/28*

U.S. Cl. 251—149.2 **3 Claims**



1. A pipe fitting comprising:

a socket body including a main member and a fitting member each formed with an internal passage;

said internal passage of said main member being formed with a stepped support portion of an annular shape;

said stepped support portion having a deformable annular valve seat acting also as a packing and a support ring securely arranged therein in order;

said main member being provided therein with an on-off valve and a helical spring acting on said on-off valve, said on-off valve being arranged on said support ring in a manner to be pivotally moved about a support shaft and normally seated on a surface of said deformable annular valve seat by an elastic force of said helical spring so that a part of said deformable annular valve seat is expanded toward said internal passage of said main member;

said main member being formed on an opening side thereof with holding through-holes which are circumferentially spaced from one another at predetermined intervals and in which balls for engagement are movably arranged;

said main member being provided on an outer periphery thereof with an operating sleeve slidable in an axial direction of said main member;

said operating sleeve being normally held at its engaged position by an elastic force of a coiled spring and formed on an inner periphery thereof with a cam surface engaged with said balls to project said balls into said internal passage of said main member; and

a connecting plug including a connecting member;

said connecting member being formed into a hollow cylindrical shape with an outer configuration sufficient to cause said connecting plug to be detachably fitted in said internal passage of said main member;

said connecting member being provided on a side thereof connected to said main member with a cylindrical connecting portion, said cylindrical connecting portion being formed on an outer periphery thereof with an annular groove engaged with said balls;

said on-off valve being opened when said connecting plug is engagedly connected with said socket body.

4,877,220

HEXASUBSTITUTED CYCLOHEXANE COMPOUNDS

Klaus Praefcke; Bernd Kohne, and Werner Stephan, all of Berlin, Fed. Rep. of Germany, assignors to Merck Patent Gesellschaft Mit Beschrankter Hafung, Darmstadt, Fed. Rep. of Germany

PCT No. PCT/EP86/00780, § 371 Date Sep. 11, 1987, § 102(e) Date Sep. 11, 1987, PCT Pub. No. WO87/04155, PCT Pub. Date Jul. 16, 1987

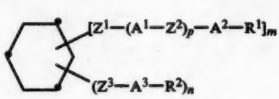
PCT Filed Dec. 24, 1986, Ser. No. 114,365

Claims priority, application Fed. Rep. of Germany, Jan. 11, 1986, 3600601

Int. Cl.[4] C09K *19/30, 19/34*; C07C *149/273, 147/02, 147/14*; C07D *211/66, 319/06, 339/08*

U.S. Cl. 252—299.61 **5 Claims**

1. A discotic liquid-crystalline phase comprising at least two liquid-crystalline components, wherein at least one component is a been substituted therefor hexasubstituted cyclohexane compound of the formula I



I

wherein $Z^1—(A^1—Z^2)_p—A^2—R^1$ is different from $Z^3—A^3R^2$ and

in which

Z^1 is —CO—X^1—, —X^1—CO—, —CH_2—X^2—, —X^2—CH_2— or —CH_2—CH_2—,

Z^2 has one of the meanings of Z^1 or is a single bond,

Z^3 is —X^1—CO— or —X^2—CH_2—

X^1 is O, S or Se,

X^2 is O, S, Se, SO or SO_2,

A^1, A^2 and A^3 each are, independently of one another, a 1,4-phenylene group which is unsubstituted or mono- or poly-substituted by halogen atoms and/or CH_3 groups and/or CN groups and in which one or more CH groups might also be replaced by N atoms, or are a 1,4-cyclohexylene group in which one or two non-adjacent CH_2 groups might also be replaced by —O— and/or —S—, or are a piperidine-1,4-diyl group or a 1,4-bicyclo[2.2.2]octylene group, and A^2 and A^3 can also be a single bond,

p is [0 or] 1,

R^1 and R^2 each are, independently of one another, alkyl having 1 to 20 C atoms, wherein one or more CH_2 groups might also be replaced by —O—, —S—, —$CHCH_3$, —CHCN—, —CHhalogen—, —CO—, —O—CO—, —CO—O— and/or —CH=CH—, or are H, F, Cl, Br, I, OH, NH_2, COOH or CN, no two heteroatoms being directly linked to one another,

m is 1, 2 or 3 and

(n+m) is 6,

with the proviso that, in at least one group,

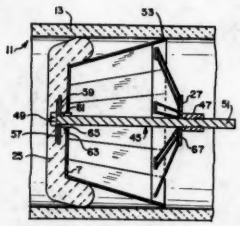
Z^1 is other than —X^1—CO—.

4,877,221

EXPANDABLE TAP HOLE PLUG

Rick R. Scriven, Riverview, Mich., assignor to Tri-Star Manufacturing & Service, Inc., Butler, Pa.

Filed Dec. 5, 1988, Ser. No. 279,502
Int. Cl.[4] C21B 7/12
U.S. Cl. 266—272 9 Claims



1. An expandable tap hole plug comprising:

a plug comprising a cylindrical member having a circular nose and an outwardly extending flexible sidewall forming a variable obtuse angle with respect to said nose, said plug being adapted to be oriented within a tap hole of a metallurgical vessel with said nose directed towards the interior of said vessel;

an expander in the form of a truncated cone, having a base and a flexible side section extending outwardly from said base forming a variable obtuse angle with respect to said base, said expander being inverted relative to said plug and attached to said plug with said side section of said expander engaging said sidewall of said plug; and

means for varying said angle between said side section and said base of said expander so as to vary said angle of said sidewall of said plug relative to said nose thereof to block said tap hole.

4,877,222

FLUID SUSPENSION SPRING AND DAMPENER FOR VEHICLE SUSPENSION SYSTEM

Leo W. Davis, Dallas, Tex., assignor to Liquid Spring Investors, Ltd., Dallas, Tex.

Division of Ser. No. 907,140, Sep. 12, 1986, Pat. No. 4,735,402, which is a continuation of Ser. No. 753,365, Jul. 5, 1985, which is a continuation of Ser. No. 550,883, Nov. 9, 1983, abandoned. This application Mar. 31, 1988, Ser. No. 175,742
Int. Cl.[4] F16F 5/00, 9/42; F15B 15/22
U.S. Cl. 267—64.13 9 Claims

1. A suspension apparatus for a vehicle for permitting displacement of wheel support means relative to a frame of said vehicle and for dampening said displacement, said apparatus comprising a hydraulic cylinder and piston assembly, including:

an elongated cylinder member defining a wall enclosed longitudinal bore and opposed head portions;

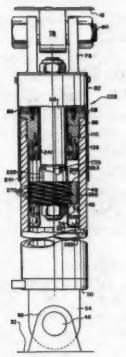
a piston reciprocably disposed for relative bidirectional movement in said bore and dividing said bore into opposed fluid chambers, and a piston rod connected at one end to said piston and extending through one of said chambers and one of said head positions to form a rod end chamber and a second end chamber;

piston rod seal means supported by said cylinder member and including means in fluid sealing engagement with said piston rod to prevent leakage of fluid from said rod end chamber to the exterior of said apparatus;

a compressible liquid fluid filling the chambers;

means for interconnecting said apparatus between said frame and said wheel support means whereby said piston and piston rod are forced into the cylinder until the fluid is compressed sufficiently in said cylinder member to support the vehicle while permitting displacement of said wheel support means;

flow restriction means formed at least partially between the piston and the cylinder for permitting only restricted flow of fluid from one chamber to the other chamber in response to reciprocation of said piston and piston rod with respect to said cylinder member to provide for damped displacement of said wheel support means with resulting heating of the fluid; and



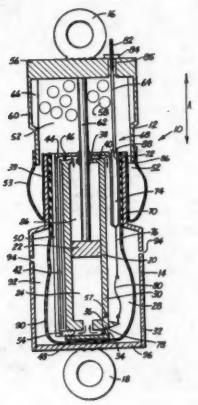
means movably associated with the piston and piston rod for at least retarding the intermingling of the fluid after the fluid has passed through the restrictive flow means and been heated therein with the major portion of the fluid in the second end chamber while maintaining the heated fluid in heat exchange relationship with the piston member, piston rod and cylinder wall adjacent thereto.

4,877,223

LOAD LEVELING SHOCK ABSORBER

Jeffrey K. Hackett, P.O. Box 68, Benedict, Minn. 56436, assignor to Jeffrey K. Hackett, Benedict, Minn.

Filed Sep. 21, 1988, Ser. No. 247,248
Int. Cl.[4] F16F 9/342
U.S. Cl. 267—64.17 21 Claims



1. A telescoping hydraulic shock absorber unit comprising:

a cylinder body having a cylinder charged with a damping medium;

a piston disposed for axial reciprocation within the cylinder and dividing the cylinder into a compression chamber and a rebound chamber;

a lift chamber disposed in relationship with the cylinder body and the piston for displacing the piston outwardly from the cylinder;

a reservoir bladder; and

a damping medium circuit path interconnecting the compression chamber, the rebound chamber, the lift chamber and the reservoir bladder including,

first one-way valve means from the compression chamber to the lift chamber,

a displacement responsive valve for passing damping medium from the lift chamber to the reservoir bladder when the piston is displaced outwardly in the cylinder beyond a predetermined level position;

second one-way valve means from the reservoir bladder to the rebound chamber,

third one-way valve means from the rebound chamber to the reservoir bladder, and

fourth one-way valve means from the reservoir bladder to the compression chamber.

4,877,224

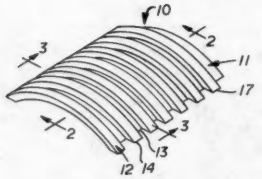
CORRUGATED ENERGY ABSORBER

James L. Watts, 2101 Wincrest, Galveston, Tex. 77551

Filed Aug. 31, 1988, Ser. No. 238,419

Int. Cl.[4] F16M *7/00;* **F16F** *1/18;* **B63B** *59/02;* **F16L** *11/00*

U.S. Cl. 267—140 **30 Claims**



1. An energy absorber for positioning on one object to absorb the impact of the later with another object comprising;

an arcuate strip of rigid resiliently deflectable material having a plurality of circumferential alternating arcuate ridge and furrow corrugations formed therein generally parallel and coaxial with the radius of curvature of said strip and the ridges of said corrugations terminating a distance beyond two opposed side edges of said strip to define laterally opposed tips,

the center of the arcuate strip bowed radially outwardly from the surface of the object on which it is to be positioned, and

said strip of material having sufficient resiliency to allow deflection of the arcuate surface of the material inwardly relative to the radius of curvature upon impact to the bowed surface and thereafter returning to its original configuration, and

the depth of said corrugations being sufficient to allow independent deflection of the corrugations relative to one another along the longitudinal axis of said strip upon impact and thereafter returning to their original configuration.

4,877,225

VIBRATION ISOLATOR

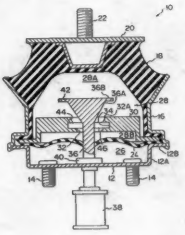
Takeshi Noguchi, Yokohama; Kazuya Takano, Kamakura, and Takashi Kikuchi, Yokohama, all of Japan, assignors to Bridgestone Corp., Tokyo, Japan

Filed Mar. 31, 1988, Ser. No. 176,276

Claims priority, application Japan, Jun. 29, 1987, 62-162101

Int. Cl.[4] F16F *9/10, 13/00*

U.S. Cl. 267—140.1 **27 Claims**



1. A vibration isolator interposed between a vibration source and a vibration receiving object and adapted to reduce and absorb vibrations transmitted from said vibration source to said object, said vibration isolator comprising:

a fluid chamber partially formed of an elastic body to expand and contract by vibrations, said fluid chamber being filled with a fluid;

a partition wall for dividing said fluid chamber into a plurality of small fluid chambers;

a relatively large central limitational passage through said partition wall capable of providing communication between said small fluid chambers;

changing means for changing the area of said central limitational passage by linearly moving itself close to or away from said central limitational passage, said changing means including a valve which abuts against said partition wall when said valve is at least substantially at the end of the stroke of its movement to at least substantially close said central limitational passage; and

first and second relatively small limitational passages through said partition wall and said valve, respectively, said first and second limitational passages being connectable to provide communication between said small fluid chambers when said valve is at least substantially at the end of the stroke of its movement, and said changing means also adapted to control the flow of said fluid through said small limitational passages;

whereby the rate at which said fluid moves between said small fluid chambers is changed so as to enable vibrations from said vibration source to be absorbed over a wide range.

4,877,226

FLUID SHOCK ABSORBER CONSTRUCTIONS

Paul H. Taylor, Grand Island, N.Y., assignor to Tayco Developments, Inc., North Tonawanda, N.Y.

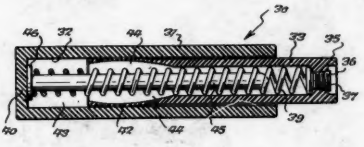
Continuation of Ser. No. 125,297, Nov. 25, 1987, abandoned. This application Apr. 12, 1989, Ser. No. 338,409

Int. Cl.[4] F16F *11/00*

U.S. Cl. 267—196 **29 Claims**

1. A fluid shock absorber comprising a cylinder, a first chamber in said cylinder, fluid in said first chamber, piston means for movement into said first chamber to increase the pressure of said fluid, and adjustable bleed means for varying the flow of said pressurized fluid relative to said first chamber, said bleed means comprising threaded plug means rotatably mounted in a tapped hole in one of said cylinder or said piston means for varying its spacing with said tapped hole by being

axially threaded relative to said tapped hole to thereby vary the rate of said flow of said fluid through said bleed means, said cylinder including a cylindrical inner surface, said piston means comprising an elongated hollow tubular member having a substantially cylindrical wall and an open end located within said cylinder and having an extreme outer edge portion immediately adjacent said open end, said substantially cylindrical wall of said elongated hollow tubular member having an outer surface having a diameter which is only slightly less than the diameter of said inner surface of said cylinder for a substantial portion of the length of said inner surface of said cylinder and for a substantial portion of the length of said elongated hollow tubular member extending away from said extreme outer edge portion, said substantially cylindrical outer surface of said wall which extends away from said extreme outer edge portion being substantially parallel to said inner surface of said cylinder, and said elongated hollow tubular member defining a second chamber in communication with said first chamber through said open end of said piston means, said second chamber extending into said elongated substantially cylindrical tubular member for a substantial portion of the length thereof inwardly of said open end, and said wall of said elongated hollow tubular member being expandible for said substantial portion of its length extending away from said extreme outer edge portion to create an increase of friction between said outer surface of said elongated hollow tubular member and said inner surface of said cylinder in response to said increase of pressure within said second chamber to thereby supplement the shock absorption resulting from said increase of pressure of said fluid in said first and second chambers, said wall of said elongated hollow tubular member returning to an unexpanded condition when said elongated hollow tubular member moves out of said cylinder.

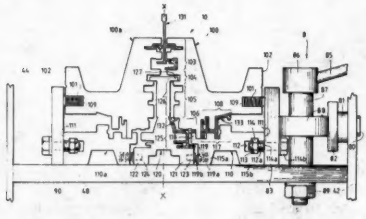


4,877,227

APPARATUS FOR MACHINING A WORK PIECE AND A JIG ASSEMBLY FOR HOLDING THE WORK PIECE

Christopher D. Sassella, Melbourne; John R. Whitney, MacLeod, and Harold K. McGeehan, Pascoe Vale, all of Australia, assignors to Dowell Australia Ltd., Victoria, Australia

Filed Jun. 30, 1987, Ser. No. 67,884
Claims priority, application Australia, Jun. 30, 1986, PH6657
Int. Cl.[4] B25B *1/20*
U.S. Cl. 269—43 **12 Claims**



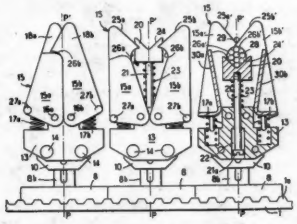
1. A set of jaws comprising at least two pairs of identical jaw pieces, at least one pair being different from the other pair, the first pair of jaw pieces being arranged in abutting relationship as mirror images of each other about a central axis and the second pair of jaw pieces being arranged as mirror images of each other spaced apart from the central axis but located equidistant on either side from the central axis, said jaw pieces being movable with respect to each other between an operative position for securely holding a profiled work piece therebetween in use and a release position allowing insertion and withdrawal of the work piece between the jaw pieces in use, said jaw pieces of the first pair of jaw pieces including a first jaw piece and said jaw pieces of said second pair including a second jaw piece, said first jaw piece having a first portion for cooperatively engaging with a first portion of said second jaw piece to facilitate engagement of the two jaw pieces together into the operative position when the jaw pieces are moved together and to facilitate movement of the jaw pieces apart from each other into the release position, said jaw pieces each having a respective second portion, said second portion of said first jaw piece having a profile complementary to the profile of one side of the work piece and said second portion of said second jaw piece having a profile complementary to the reverse side of the work piece so that when the jaw pieces are in the operative position the space defined between the two respective second portions substantially corresponds to the profile of the work piece, whereby damage and distortion of a work piece inserted into the space during selective machining of the work piece is substantially avoided.

4,877,228

CLAMP FOR FITTING TO A CONVEYOR OF AN AUTOMATIC CABLING MACHINE AND INTENDED TO HOLD ONE OR MORE ELECTRICALLY CONDUCTIVE WIRES

Victor L. Ripert, Aix-en-Provence, France, assignor to Automatisme et Robotique Appliques -A.R.A., La Barque, France

Filed Jul. 26, 1988, Ser. No. 224,544
Claims priority, application France, Aug. 7, 1987, 87 11392
Int. Cl.[4] C25B *1/00*
U.S. Cl. 269—156 **11 Claims**



1. A clamp for fitting to a conveyor in an automatic cabling machine for the purpose of holding one or more electrically conductive wires, the clamp comprising two pairs of jaws hinged to a fixed base, each of said pairs comprising two jaws which are symmetrical about a plane of symmetry and which are fitted with return means for urging them automatically towards a closed position, said pairs being spaced apart by an intermediate space, and said clamp further including a central piston which is situated in said intermediate space, which is symmetrical about said plane of symmetry, and which is fitted with return means for urging it automatically towards the free ends of said jaws.

4,877,229
METHOD OF EXTRACTING AND ACCELERATING FLAT OBJECTS

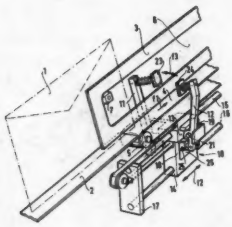
Emmanuel Delbe, Granges Les Valence; Francois Gillet, Parmain; Etienne Serot; Raymond Chifflet, both of Granges Les Valence; Roland Allio, La Roche De Glun; Philippe Jeantin, Valence; Gilbert Del Fabro, La Roche De Glun, and Guy Forella, Saint Peray, all of France, assignors to Societe anonyme dite: Compagnie Generale D'Automatisme CGA-HBS, Paris, France

Filed Jun. 30, 1988, Ser. No. 213,562

Claims priority, application France, Jul. 1, 1987, 87 09312

Int. Cl.[4] B65H *5/10*

U.S. Cl. 271—2 **7 Claims**



1. A method of extracting and accelerating flat postal items presented in an outlet position of an unstacking head for use by a machine downstream therefrom, said method making use of a clamp for grasping said flat postal items one-by-one and of various sensors to indicate the presence of a postal item in the outlet position of the unstacking head, or in the field of action of the clamp, and to indicate that the clamp is in a waiting position or in an end-of-stroke position, said method comprising the following steps:

moving said clamp to a waiting position;

when the presence of a postal item is expected in the outlet position from the unstacking head, driving the carriage towards the outlet position of the unstacking head;

detecting the presence of the postal item within the field of action of the clamp, closing said clamp and driving said carriage towards the downstream machine;

detecting the lack of continued presence of a postal item in the outlet position of the unstacking head, unclamping said clamp, thereby releasing the postal item; and

stopping the carriage and returning said carriage to the waiting position.

4,877,230
COMPACT APPARATUS FOR DISPENSING A PRESELECTED MIX OF PAPER CURRENCY OR THE LIKE

Theodore Winkler, Levittown, Pa., and Fredric W. Burger, Cherry Hill, N.J., assignors to Brandt, Inc., Bensalem, Pa.

Continuation of Ser. No. 941,301, Dec. 12, 1986, abandoned, which is a division of Ser. No. 699,044, Feb. 7, 1985, Pat. No. 4,660,822. This application Mar. 10, 1988, Ser. No. 169,139

Int. Cl.[4] B65H *3/44*

U.S. Cl. 271—3 **6 Claims**

1. Apparatus for selectively dispensing sheets from a plurality of individual dispensing devices and for transporting dispensed sheets to a delivery location including in combination

an output stacker at said delivery location for receiving dispensed sheets,

means mounting said devices in serial relationship along a generally horizontal line,

a belt disposed below said devices along said line and common to said devices for transporting dispensed sheets along a path leading to said output stacker,

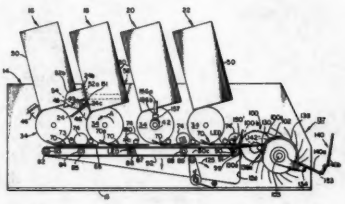
a plurality of beltsupporting rollers disposed at spaced locations along said belt,

a plurality of pinch rollers respectively associated with said dispensing devices,

means mounting said pinch rollers in cooperative relationship with said belt at the locations of said belt-supporting rollers to form pairs of upper and lower rollers, means for urging the rollers of each pair toward each other to form a plurality of drive nips associated with the respective dispensing devices,

said dispensing devices including respective input stackers for receiving stacks of sheets,

said dispensing devices including respective feed means for feeding sheets one-at-a-time from the bottom of a stack in its input stacker to advance the leading edge of each sheet into the associated drive nip,



and means for driving said belt positively to drive sheets entering said nips along said path leading to said output stacker,

the arrangement being such that sheets from dispensing devices relatively remote from said output stacker pass through the drive nips associated with dispensing devices relatively adjacent to said output stacker,

a platform for supporting said belt; and means for raising and lowering said platform and said belt-supporting rollers and said belt between a first position adjacent said pinch rollers and a second position displaced from said pinch rollers.

4,877,231
DEVICE FOR FEEDING AND DISCHARGING ORIGINALS IN SHEET FORM

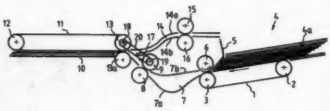
Gerardus M. H. M. Jacobs, Velden, and Johannes H. A. Dinnissen, Venlo, both of Netherlands, assignors to OCE-Nederland B.V., Venlo, Netherlands

Continuation of Ser. No. 891,682, Jul. 29, 1986, abandoned. This application Mar. 23, 1988, Ser. No. 172,941

Claims priority, application Netherlands, Aug. 2, 1985, 8502175

Int. Cl.[4] B65H *5/06*

U.S. Cl. 271—3.1 **3 Claims**



1. In a device for feeding originals in sheet form to and from an exposure window of a copying machine having: a holder for storing originals; a feed path for guiding said originals from said holder to said exposure window; a cooperating pair of rollers mounted in said feed path for conveying the originals therein; a conveyor adapted to be driven in a first direction for conveying said originals from said feed path to and over said exposure window and thereafter driven in a second and opposite direction for removing the originals from said exposure window; a discharge path for returning said originals from said exposure window to said holder; and a drive means for driving

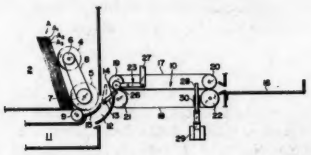
said pair of rollers, the improvement in combination therewith comprising a mechanical coupling means mounted between said pair of rollers and said conveyor for stopping said pair of rollers or reversing the direction of rotation of said pair of rollers during or substantially during the periods of time in which said conveyor is driven in said second direction, whereby there is a fixed time relationship between the times at which the states of rotation of said pair of rollers and the conveying direction change.

4,877,232

PAPER DISCHARGE APPARATUS

Tomoyuki Nakanishi, Moriyama, Japan, assignor to Omron Tateisi Electronics Co., Kyoto, Japan

Filed Jun. 8, 1988, Ser. No. 203,813
Claims priority, application Japan, Jun. 15, 1987, 62-91624[U]
Int. Cl.[4] B65H *3/06*
U.S. Cl. 271—10 **3 Claims**



1. A paper discharge apparatus for discharging paper in sequence beginning from an endmost paper of a plurality of papers accommodated in a container, comprising:

(a) first let-out roller means, disposed in contact with a portion adjacent to a first end of an endmost paper, for discharging the endmost paper;

(b) second let-out roller means, disposed in contact with a portion adjacent to a second end of the same endmost paper remote from the first end, for discharging a second paper in contact therewith after said first let-out roller means has let out the endmost paper a little;

(c) paper conveying means for conveying the paper delivered by said first and second let-out roller means to a paper discharge outlet;

(d) means for operating said first and second let-out roller means and paper conveying means in order to feed papers from said plurality of papers in said container in an overlapped condition in which successive fed papers are shifted from one another in a direction of paper conveyance through said paper conveying means with a part of a preceding paper being superimposed upon part of a succeeding paper;

(e) paper stopping means, movably disposed midway of said paper conveying means, for stopping paper being conveyed when moved into a paper convey path of said paper conveying means; and

(f) paper thickness sensing means, disposed between said first let-out roller means and said paper stopping means, for detecting a thickness of paper being conveyed by said paper conveying means.

4,877,233

ROTARY VACUUM WICKETTER

Earl T. Pottorff, 2346 Taylor Rd., Savannah, N.Y. 13146

Filed Sep. 23, 1988, Ser. No. 248,134
Int. Cl.[4] B65H *29/24*
U.S. Cl. 271—196 **15 Claims**

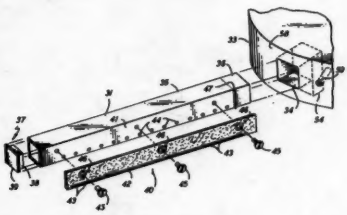
1. Rotary vacuum pickup apparatus for carrying flat workpieces from a first work station and placing the workpieces on a wicket at a second work station; comprising

a vacuum hub assembly formed of a stationary hub and a rotary hub superposed on one another and having a common axis,

the stationary hub including vacuum channel means for applying vacuum over a predetermined angular portion of the superposed rotary hub, and

the rotary hub having a peripheral surface, an axial surface in communication with the vacuum channel means of the stationary hub, and a plurality of spaced sockets which penetrate to said axial surface to communicate with said vacuum channel means; and

a plurality of radial arms mounted in the rotary hub and projecting radially outward therefrom, each said arm being a tube closed at its radial outward end, having a



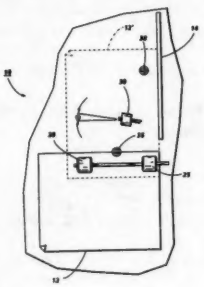
male portion at its radial inward end which fits into a respective one of said sockets, and having a flat longitudinal face on the side that faces in the rotation direction of said rotary hub and which is provided with perforations therethrough so that the arm can carry said workpieces by vacuum from the first work station to said second work station; comprising the improvement herein each said arm is of uniform internal cross section from the radial outward end to and including the male portion, so that blind pockets are avoided where dust might accumulate.

4,877,234

SHEET TURNING AND REGISTRATION SYSTEM

Barry P. Mandel, Fairport, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed Aug. 2, 1988, Ser. No. 227,381
Int. Cl.[4] B65H *7/02*
U.S. Cl. 271—225 **7 Claims**



1. A sheet turning mechanism having the capability of turning sheets 90 degrees and registering them against a registration member or passing them unturned but registered is adapted for use with a folder apparatus and characterized by at least one pair of crowned rollers that form nips with cooperating idler rollers; sensor means adapted to provide a signal when blocked by a sheet to a clutch mechanism that stops one of said at least one of said pair of crowned rollers with the other of said at least one pair crowned of rollers continuing to revolve and thereby rotate each sheet 90 degrees; means for re-energizing said stopped crowned roller after each sheet has

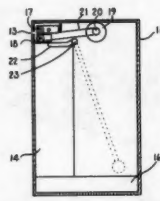
finished rotating; and scuffer means for registering each sheet after it leaves said at least one crowned roller pair.

4,877,235

CURRENCY SORTER AND STORAGE DEVICE

Larry A. Robinson, Boise, Id., and Richard R. Robinson, Red Feather Lakes, Colo., assignors to Tidel Systems, Inc., Carrollton, Tex.

Filed Jul. 14, 1988, Ser. No. 218,954
Int. Cl.[4] B65H *29/22*
U.S. Cl. 271—279 **19 Claims**



1. A currency sorter and storage device which comprises:
a lockable storage container having a front plate, said front plate having a plurality of currency receiving slots;
a plurality of currency receiving chutes disposed and aligned within said container, each for receiving and holding currency inserted into said storage container through a currency receiving slot;
a pair of currency rollers held in parallel spaced relationship for receiving and transporting currency inserted through said currency receiving slots to the currency receiving chutes, said rollers rotatably mounted within the storage container behind said currency receiving slots;
means for rotating said rollers when currency is inserted through said currency receiving slots;
a rotatable shaft disposed in parallel spaced relation with said currency rollers and having one end extending to the exterior of said storage container;
a plurality of biasing dogs radially attached to said rotatable shaft, each of said dogs disposed for radial displacement about the axes of said rotatable shaft and for downwardly biasing currency in said currency receiving chute;
means for biasing currency into said currency receiving chutes; and
means for separating currency in each chute by chronological time of insertion.

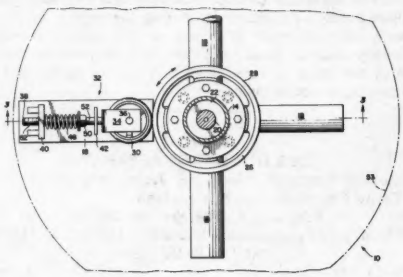
4,877,236

ROTATING PLAYGROUND EQUIPMENT ASSEMBLY

William H. Shannon, Mentone, Ala., assignor to Game Time, Inc., Ft. Payne, Ala.

Filed Dec. 14, 1984, Ser. No. 681,587
Int. Cl.[4] A63G *1/12*
U.S. Cl. 272—33 R **31 Claims**

1. A rotating user-propelled playground equipment assembly comprising:
an equipment support base,
a substantially vertical spindle secured to said support base,
a rotatable platform assembly supported at least in part by said support base,
said rotatable platform assembly including a substantially vertical hub assembly rotatable about said spindle,
a pressure wheel rotatable about a rotation axis and positioned to rollingly engage said hub assembly, and
said support base including an urging means connected to said pressure wheel for urging said pressure wheel into rolling engagement with said hub assembly and biasingly urging said rotation axis towards said hub assembly and



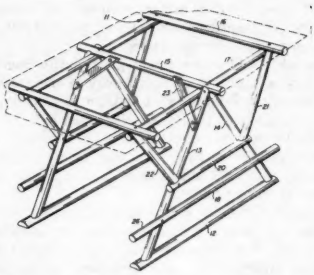
thereby automatically retarding the rotation of said rotatable platform assembly about said spindle.

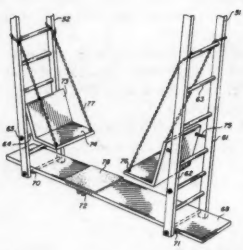
4,877,237

MULTIPURPOSE STRUCTURE

Rowland H. Goble, P.O. Box 423, Lake Mary, Fla. 32746

Division of Ser. No. 583,651, Feb. 27, 1984, Pat. No. 4,804,176.
This application Jan. 3, 1989, Ser. No. 293,070
Int. Cl.[4] A63B *17/04*
U.S. Cl. 272—54 **7 Claims**





1. A multipurpose structure comprising in combination:
a frame having a plurality of frame members;
a roof supported by said frame;
a first ladder member having a plurality of rungs pivoted from one end thereof to said frame;
a second spaced ladder member having a plurality of rungs pivoted from one end thereof to said frame;
means to support said first and second ladder members adja-

cent to said roof in one position for storage and in a hanging pivoting position in a second position thereof;

fastener means attached to said frame for holding said first and second ladder members in a raised storage position; and

a connecting board operatively and removably connected between said first and second spaced ladder members for holding said ladder members in a predetermined spaced relationship when swinging said first and second ladder members on their pivots whereby a multipurpose structure provides for a storable swinging portion.

4,877,238

SWING EXERCISER

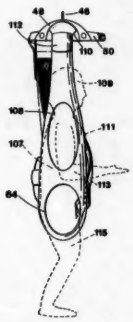
Arthur L. Barrett, 651 Espanita St., Long Beach, Calif. 90815

Continuation-in-part of Ser. No. 40,375, Apr. 20, 1987, Pat. No. 4,763,894. This application Aug. 5, 1988, Ser. No. 229,122

The portion of the term of this patent subsequent to Aug. 16, 2005, has been disclaimed.

Int. Cl.[4] A63B *1/00*; A63G *9/00*

U.S. Cl. 272—70 **16 Claims**



1. A swing exerciser comprising:

a. a support frame;

b. a U-shaped sling formed of a unitary fabric band having a bottom with contiguous, integral and opposite sides formed by the upper ends of said fabric band which are attached to said support frame; with

c. opposite leg apertures through said fabric band at said bottom of said sling;

d. an arm aperture through said fabric band at each of said sides;

e. a back support band extending downwardly from said support frame and secured to the rear edges of said sides at the lower portion of said sling; and

f. front support means removably secured to said sides, whereby a user can be supported in said sling and secured therein with said sling enclosing the sides and back of the upper torso of the user and said front support means securely fastening said user in said sling.

4,877,239

THIGH MUSCLE STRETCHING DEVICE

Gregorio Dela Rosa, 3117 Laconia La., Aurora, Ill. 60504

Filed Jan. 3, 1989, Ser. No. 292,836

Int. Cl.[4] A63B *23/04*; A61H *1/02*

U.S. Cl. 272—126 **5 Claims**

1. A device for aiding user stretching of adductor and other muscles of the thighs, said device comprising:

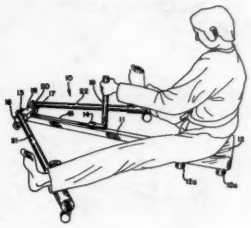
an elongate spine or main shaft having top and bottom sides and front and back ends;

a seat bottom retained on said top side of said spine adjacent said back end thereof;

an elongate worm gear mounted for free rotation in spatial parallel relation to said spine adjacent said front end thereof;

user operated means for rotating said worm gear in clockwise and counterclockwise directions;

a movable housing including a threaded bore therethrough which is engaged with said worm gear to travel substantially the length of said gear; and



a pair of elongate rod members, each mounted at one end to said housing on opposing sides of said threaded bore therethrough, said elongate members each including a distal end having cushioning means thereon adapted for engaging a user's leg said mounting between each of said one ends of said elongate rod members and said housing assembly including means for pivoting each said rod member in two perpendicular planes, and any combination thereof relative said movable housing.

4,877,240

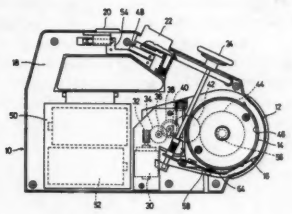
PROJECTION TOY

Dai Aoki, Tokyo, Japan, assignor to Nikko Co., Ltd., Tokyo, Japan, a part interest

Filed Feb. 26, 1988, Ser. No. 160,860

Int. Cl.[4] A63F *9/14*

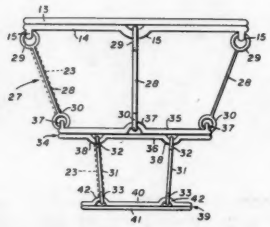
U.S. Cl. 273—1 GA **2 Claims**



1. A projection toy with a game function comprising a case body having a transparent window, a cylindrical transparent film within the case body in alignment with the window, a lamp within the cylindrical film to shine through the film to project on a remote surface an image on the film, a running game body overlying the film to cast a shadow on the remote surface in the light from the lamp, a moving plate on which the running body is mounted, means operable from the outside of the case body to move the moving plate parallel to the axis of the cylindrical film to move the position of the shadow cast by the running body in a direction parallel to the axis of the film, a rotary supporting member that carries the film for rotation about the axis of the film, an electric motor within the case body connected by gearing to the rotary supporting member to rotate the rotary supporting member and the film, the rotary supporting member having plural groove portions therein displaced from each other in a direction parallel to the axis of the film, said moving plate having a protrusion thereon that is

selectively engageable in said groove portions to temporarily stop the rotation of said rotary supporting member.

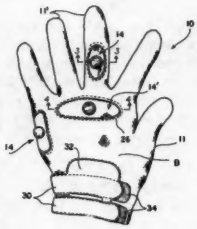
4,877,241
BASKETBALL HOOP AND NET APPARATUS
Robert Rothbard, 4900 Laurel, Bellaire, Tex. 77401
Filed Dec. 7, 1987, Ser. No. 129,184
Int. Cl.[4] A63B *63/08*
U.S. Cl. 273—1.5 R **14 Claims**



1. A basketball hoop and net apparatus comprising;
a circular rim member,
a continuous circular net supporting ring member secured to the underside of said rim member and coaxial therewith and having a plurality of integrally formed circumferentially spaced semicircular depending loops about its periphery,
a mounting bracket secured to the outer periphery of said rim member and said ring member for mounting said hoop to a backboard,
a net assembly comprising a series of separate elongate rod members each having an eye at their top and bottom ends,
a continuous circular bottom ring smaller in diameter than said rim member secured to the bottom ends of said net assembly rod members,
the eyes at the top ends of said rod members slidably received each on one loop of said net supporting ring and movably captured between said rim and said net supporting ring when secured together and the eyes at the bottom ends of said rod members each movably connected by said circular bottom ring in generally vertical circumferentially spaced relation to allow a basketball to side therethrough.

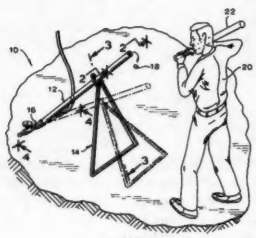
4,877,242
APPARATUS FOR PLAYING BILLIARDS OR POOL
Jewell P. W. James, 4305 1/2 Lummi Shore Rd., Ferndale, Wash. 98248
Filed Oct. 15, 1987, Ser. No. 108,626
Int. Cl.[4] A63D *13/00*
U.S. Cl. 273—2 **7 Claims**

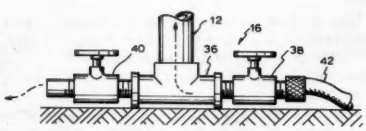
1. An apparatus for playing the game of billiards or pool without a cuestick comprising;
a glove for use on a player's hand having a palm, back and finger projections,
a cue adapter including a protective element having an opening disposed on said back of and attached to said glove,
a substrate member captively disposed within said protective element and provided with fastening means,
a cue insert element having a head joined to a shank,
fastening means on said shank mating with said substrate member fastening means to provide attachment therebetween, and
a cue cap on said cue insert head disposed at an elevation substantially spaced from said glove, whereby



a wearer of said glove may strike a cue ball directly with said cue insert element cue cap as said substrate member absorbs the shock of such striking.

4,877,243
AUTOMATIC BALL PITCHER
Jim Taylor, 102 S. College St., Thomasville, Ga. 31792
Filed Jun. 30, 1987, Ser. No. 68,896
Int. Cl.[4] A63B *69/40*
U.S. Cl. 273—26 R **16 Claims**





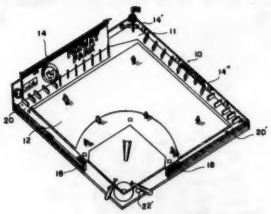
1. An automatic ball pitcher comprising:
a hollow elongated member having a top end and a bottom end;
support means for maintaining the top end at a desired height and position, said support means including means to adjust the top end of said elongated member to a variety of heights and positions;
a plurality of spherical objects adapted to be inserted in said elongated member; and,
inlet means for introducing a volume of liquid into said elongated member to cause said spherical objects to float towards and be singularly dispensed out of the top end of said elongated member.

4,877,244

BASEBALL GAME APPARATUS

Garry L. Burrows, 924 Rodman Way, and Michael R. Burrows, 937 Rodman Way, both of, Baltimore, Md. 21205

Filed Mar. 8, 1988, Ser. No. 164,873
Int. Cl.[4] A63F 7/06
U.S. Cl. 273—89 5 Claims



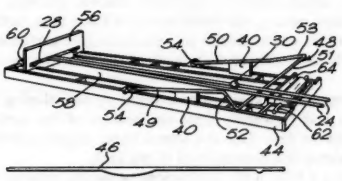
1. An apparatus resembling an actual baseball stadium having a playing surface, home plate and baseball field indicia, for playing a simulated baseball game comprising;
a simulated baseball;
hitting means including simulated bats rotatably affixed to both the left and right side of home plate;
pitching means for initiating and directing a pitch toward home plate;
fielding means including resilient indicia representing fielders affixed at designated areas on the playing surface;
hit valuation means;
means thereon for advertising products or services, said means including means to change the message as desired; whereby a simulated game of baseball is played thereon.

4,877,245

GAME APPARATUS

Kenneth A. Haynes, 55 Garden Walk, Royston, Hertfordshire, England (SG8 7JE)

PCT No. PCT/GB87/00236, § 371 Date Nov. 30, 1987, § 102(e) Date Nov. 30, 1987, PCT Pub. No. WO87/05820, PCT Pub. Date Oct. 8, 1987
PCT Filed Apr. 6, 1987, Ser. No. 132,096
Claims priority, application United Kingdom, Apr. 4, 1986, 8608284; Nov. 14, 1986, 8627235
Int. Cl.[4] A63B 67/14
U.S. Cl. 273—110 22 Claims



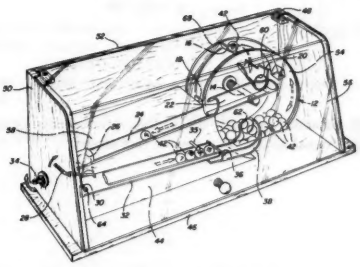
1. A game apparatus comprising frame means, a pair of rods which define a track and which are mounted on or in the frame means so as to line at a shallow upward angle to the horizontal from one end where they are mounted on or in the frame means to the other end where they are capable of relative movement, and a rolling element arranged to move along the track defined by the rods from said one end towards said other end upon relative movement of the rods, the angle to the horizontal at which the rods lie being capable of adjustment to vary the angle relative to the horizontal of the track defined by the rods, and a grid member of clear plastics material arranged to be received by the frame means and which when the rolling element is dropped thereon restrains the rolling element from rolling movement.

4,877,246

MIXING AND DISPENSING APPARATUS FOR GAME

James Kropkowski, 1012 Henderson Blvd., Fair Lawn, N.J. 07410

Filed Jul. 8, 1986, Ser. No. 883,178
Int. Cl.[4] A63B 71/00
U.S. Cl. 273—144 R 1 Claim



1. A device for mixing and selecting a plurality of balls said device comprising:
a base;
first and second side walls mounted on said base;
a back wall mounted on said base and affixed to said side walls;
shaft means mounted for rotation in said back wall;
a rotating cylindrical container coupled to said shaft means and rotatably mounted thereon;
a cover mounted on said shaft means, said cover enclosing said rotating container , a ramp support cover mounted on said back wall and extending outwardly therefrom to form an inclined surface;
ramp means for permitting the balls to pass therealong formed integrally on said ramp support cover;
an aperture formed in said ramp support cover for permitting said balls to pass from a first ramp to a first location;
a second ramp means pivotedly mounted about said first location beneath said aperture;
means coupled to said second ramp means for pivoting same about said first location;
means coacting with said pivoting ramp means for inhibiting said selected balls from passing further along said pivoting ramp means when said ramp is in a first position and permitting balls to pass beneath said inhibiting means when said pivoting ramp means is in its second, pivoted position;
third ramp means coupled to said cover for returning said selected balls to said container on pivoting said pivoting ramp means to its second position ; all of said ramp means providing a continuous path for said balls.

4,877,247

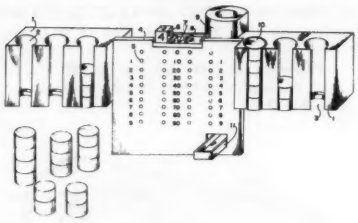
BACKGAMMON SCORE TOWER

Raymond L. Francis, P.O. Box 1015, Youngstown, Fla. 32466

Filed Oct. 24, 1983, Ser. No. 544,989
Int. Cl.[4] A63F 9/00, 9/04, 3/02
U.S. Cl. 273—148 R 12 Claims

1. A score tower for use with a backgammon game board having a doubling cube and stones comprising:
(a) a body;
(b) thirty stones;
(c) means for keeping score;
(d) means in said body for holding said doubling cube; and
(e) means for retaining said stones in groups of five compris-

ing six recesses in said body, each recess having an edge slot, a bottom shoulder, and a finger groove extending into



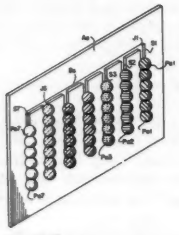
said shoulder beneath the recess, each recess having a depth equal to the thickness of five stones.

4,877,248

AMUSEMENT DEVICE WITH PLAYING PIECES REARRANGABLE IN SLOTS

Hefetz Farraj, 8 Harakevet Street, Lod, Israel

Filed Apr. 18, 1988, Ser. No. 182,929
Claims priority, application Italy, Feb. 23, 1988, 85505
Int. Cl.[4] A63F *9/08*
U.S. Cl. 273—153 S **18 Claims**



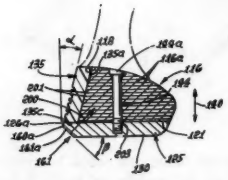
18. An amusement device comprising a rigid, double-sided surface, a series of elongated slots, each closed at one end, and a bridging slot which interconnects the other ends of the slots, forming a common passage thereamong, a plurality of playing-pieces each freely slidable along and manipulable from any elongated slot to any other elongated slot via the bridging slot, the playing-pieces constituting a number of groups carrying thereon distinctive features including at least one of color and shape, the number of said groups corresponding to the number of the elongated slots, the number of playing-pieces of one of said groups being such that the passage of playing-pieces of other groups across a junction of the respective slot and the bridging slot is blocked when all of the playing-pieces in said one group are disposed in said respective slot, and wherein the number of playing-pieces of one group exceeds the number of the pieces in the remaining groups.

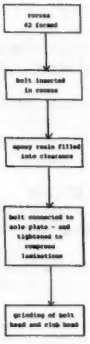
4,877,249

GOLF CLUB HEAD AND METHOD OF STRENGTHENING SAME

Stanley C. Thompson, 2702 S. Fairfax Ave., Culver City, Calif. 90232

Continuation-in-part of Ser. No. 31,535, Mar. 30, 1987, Pat. No. 4,775,156, and Ser. No. 929,099, Nov. 10, 1986, Pat. No. 4,756,534. This application May 31, 1988, Ser. No. 200,235
Int. Cl.[4] A63B *53/04*; B23P *9/00, 19/00*; B32B *31/16*
U.S. Cl. 273—169 **19 Claims**





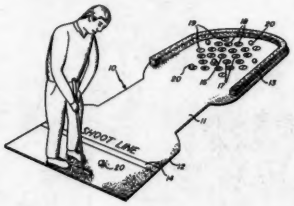
1. The method of strengthening a golf club head having laminations which extend in vertically stacked relation, and generally horizontally, the head having a front face, bottom and top surfaces, and a metallic sole plate having a keel extending generally forwardly at the bottom of the head, the method including:

(a) forming on the keel a forwardmost surface sloping upwardly and forwardly from the bottom of the keel, to intersect the front face at a lateral linear location substantially above the bottom level of the keel,

(b) forming a hole in the laminations vertically between the top of the head and the keel, rearwardly of said forwardmost sloping surface,

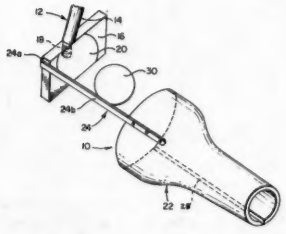
(c) and clamping said laminations by bolting them together directly above the keel, and rearwardly of said forwardmost sloping surface, said bolting step including introducing a bolt downwardly into said hole and rigidly connecting the lower end of the bolt to the sole plate directly above the keel and at substantially the level of the keel forwardmost sloping surface so that a normal to said sloping surface intersects said bolt, whereby the keel forwardmost sloping surface, upon striking the ground during a golf swing, will transfer force upwardly and rearwardly toward the bolt via the head laminations.

4,877,250
PORTABLE GOLF PUTTING COURSE
Rocco Centafanti, 27 India St., Portland, Me. 04101
Filed Feb. 8, 1988, Ser. No. 153,601
Int. Cl.[4] A63B *69/36*
U.S. Cl. 273—176 FB **1 Claim**



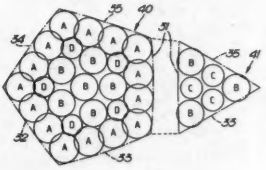
1. A course for use in playing a game with a putter and golf balls, said course including a greens section of substantial length and having first and second ends and of uniform thickness throughout its length, said green section consisting of a flexible surface layer, a substantially thicker and flexible underlying layer of the size and shape of the surface layer, said layers united in face to face contact, the exposed material of the surface layer offering a non-deflective degree of opposition to a putt ball and provided at the second end with at least one objective painted or printed on the surface layer towards which a ball is to be putted from the first end, the width of said course such that a person about to putt may stand on the first end in a substantial range of positions transversely thereof, the underlying layer of sufficient firmness to provide non-wrinkling support for the surface layer, said course sufficiently flexible to enable the course to be formed into a roll for shipment or storage, a U-shaped retaining wall, and means detachably attaching the wall to the second end with the wall opening towards the first end with the objective spaced from but bordered by said wall, said means comprising sections of hook and eye fasteners spaced from each other on the upper surface of the greens section and the surface of the wall to be secured thereto, the hook and loop sections arranged to enable the wanted U-shape of the wall to be established when corresponding portions of the wall and of the greens sections are in mutual contact, said wall sufficiently flexible to enable the wall, when detached, to be folded upon itself for shipment or storage.

4,877,251
PUTTING DEVICE
Wayne Faust, 2941 Kinwood Dr., Antioch, Tenn. 37013
Filed Aug. 19, 1988, Ser. No. 234,081
Int. Cl.[4] A63B *69/36*
U.S. Cl. 273—194 A **12 Claims**



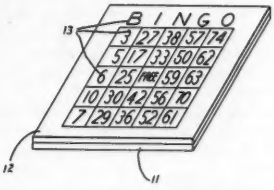
1. A novelty golf putter device comprising:
a putter including a shaft and putter head;
guide means for guiding the path of travel of a golf ball or a facsimile thereof, after the ball is struck by the putter head; and
connecting means connecting said guide means to said putter and supporting said guide means in fixed, spaced relationship to said putter head forwardly of the putter head in the direction of movement of the putter head when striking the ball, by an amount sufficient to permit the insertion of such a golf ball or facsimile thereof between the putter head and the guide means.

4,877,252
GOLF BALLS
Michael Shaw, Wakefield, England, assignor to Dunlop Limited a British Company, United Kingdom
Filed Oct. 20, 1988, Ser. No. 260,069
Claims priority, application United Kingdom, Nov. 3, 1987, 8725685
Int. Cl.[4] A63B *37/14*
U.S. Cl. 273—232 **10 Claims**



1. A golf ball having in its spherical outer surface a plurality of dimples, wherein at least 10% of said dimples are so disposed relative to one another that any two of said dimples which are adjacent each other on said outer surface have peripheries which extend inside each other to form an overlapping region.

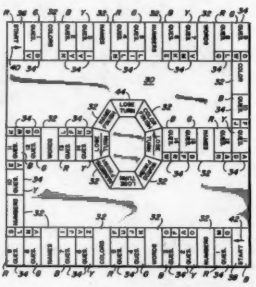
4,877,253
REUSABLE BINGO CARD
Robert P. Arens, North St. Paul, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.
Filed Feb. 6, 1987, Ser. No. 12,547
Int. Cl.[4] A63F *3/06*
U.S. Cl. 273—240 **9 Claims**



1. A repeatedly reusable Bingo card comprising sheet material having an exposed layer that is microporous and comprises an organic polymer having interconnected microvoids, said exposed layer being permanently imprinted with at least one rectangle divided into individual smaller rectangles, at least five of said smaller rectangles being permanently imprinted with a number of one or two digits, each of said numbers being substantially darker in color than the background are within said smaller rectangles, said exposed layer being bonded to a liquid-impervious support sheet having a Hunter L value on the order of 30–55, substantially darker than the background are within said smaller rectangles but substantially lighter than

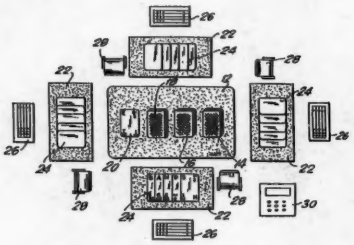
said numbers, whereby when the area within a smaller rectangle is contacted with a colorless volatile liquid that is a non-solvent for said organic polymer and has a refractive index smaller to that of said polymer, the thus-contacted portions of the microporous layer become temporarily transparent, exposing the support sheet and forming indicia that are darker than said background area but lighter than said numbers, whereby it can be determined that the area within a given small rectangle has been marked but the number therein remains visible, volatilization of said liquid restoring said Bingo card to its original appearance.

4,877,254
BOARD GAME
John J. Yuscavage, 8 Gardner La., Mountaintop, Pa. 18707
Filed Dec. 9, 1988, Ser. No. 281,788
Int. Cl.[4] A63F *3/00*
U.S. Cl. 273—249 **6 Claims**



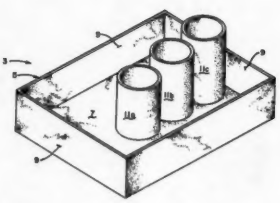
1. A board game comprising
(a) a plurality of separate player pieces,
(b) board means having a plurality of first and second spaces defining a travel path for said player pieces,
(c) said first spaces including indicia referring to a general subject category and said second spaces including indicia referring to a question, a number and a color,
(d) random chance control means for controlling the movement of said player pieces along said path of said board means, said random chance control means includes a number for determining the number of said first and second spaces to be advanced by one of said player pieces, colors corresponding to the color indicia of said second spaces and a letter of the alphabet corresponding to the letters of alphabet answer cards,
(e) a plurality of general subject category cards corresponding to said indicia of said first spaces with each of said general subject category cards having questions and answers thereon,
(f) a plurality of said alphabet answer cards corresponding to said indicia of said second spaces with said alphabet answer cards having answers to said question on said second spaces thereon with said alphabet answer cards arranged in alphabetical order and each alphabet answer card further listing answers by number, whereby during play of said board game when one of said player pieces lands on one of said second spaces, a player is asked to provide an answer to said question on said one of said second spaces beginning with the letter on said random chance control means which has the same color as the color on said one of said second spaces with the answer to said question appearing on the alphabet answer card having the same letter as said letter on said random chace control means.

4,877,255
WORD CARD GAME
Harold von Braunhut, P.O. Box 809, Bryans Road, Md. 20616
Filed Apr. 19, 1988, Ser. No. 183,645
Int. Cl.[4] A63F *1/04*
U.S. Cl. 273—299 **12 Claims**



1. A deck of symmetric playing cards, which can be held in either of two opposing orientations to provide equivalent card designations, and comprising a plurality of individual cards, each card having a front and back face, first designator means in a first location of the front face for associating a first designation to the card when retained in a first orientation, second designator means equivalent to the first designator means in an opposing location of the front face for associating a second designation to the card when retained in a second orientation opposite to the first orientation and equivalent to the first designation, said first and second designators being alphabet indicia, whereby the card is symmetric in its two orientations, first indicator means in a third location of the front face associated with said card in its first orientation for providing an indication of the second designation, second indicator means in a fourth location of the front face, associated with said card in its second orientation for providing an indication of the first designation of the card, and further comprising a numeric indication means in both orientations of the card for designating a single numeric value to each card for both first and second designations in both first and second orientations.

4,877,256
TOSSING GAME
David R. Falloon, 901 Pickering, Montgomery City, Mo. 63361
Continuation of Ser. No. 936,142, Nov. 28, 1986, abandoned.
This application Aug. 17, 1988, Ser. No. 233,148
Int. Cl.[4] A63B *63/04*
U.S. Cl. 273—400 **3 Claims**



1. A tossing game comprising a pair of spaced target areas and a plurality of projectiles tossed by one or more players from a position proximate one of the target areas to the other, each of said target areas comprising a tray having a base adapted to rest on the ground and upstanding vertical walls around the base, a plurality of vertical cups within the tray of varying height secured to the tray base, with said cups being arranged on their respective said base generally along a line

between said target areas with the ends of said target areas closest to one another constituting their front ends with their ends distal one another constituting their respective rear ends, with the shortest of said cups being in front and extending above the level of said vertical walls, with the tallest of said cups being in the rear, and positioned adjacent to and in touching relation with the rear vertical wall of the tray, and with the height of any intermediate cups progressively increasing from front to rear, said cups being in side-to-side touching relation, said cups each having a cross section ranging between about 1.2 and 2.2 times the maximum cross section of said projectile such that the cups are capable of receiving said projectiles when tossed therein, said tray having side vertical walls the distance between said cups and the side vertical walls being between about 1.2 and 2.2 times the maximum size of said projectiles so as to receive said projectiles landing within the walls of the trays on the base outside of said cups.

4,877,257

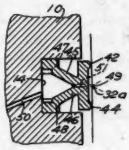
PISTON RING

Russell D. Ide, 28 Daniel Dr., Coventry, R.I. 02816

Continuation of Ser. No. 86,873, Aug. 19, 1987, abandoned. This application Jan. 6, 1989, Ser. No. 295,002

Int. Cl.[4] F16J *15/32;* **F02F** *75/06*

U.S. Cl. 277—206 A **13 Claims**



6. A piston and piston ring assembly comprising a piston having a predetermined diameter, the piston having at least one ring groove therein; a piston ring received in the ring groove, the piston ring comprising an outer sealing face member and an outer sealing face member support structure, the outer sealing face member having a cylindrical sealing face which has a diameter greater than the predetermined diameter of the piston, the outer sealing face member being supported within the ring groove by the support structure and extending circumferentially around the piston, the support structure supporting the sealing face such that under load the sealing face member deflects so as to form a hydrodynamic wedge.

4,877,258

FOLD BELLOWS FOR ROTATING VEHICLE DRIVE JOINT

Claus-Christian Alt, Ebersbach; Rudolf Gobel, Stuttgart; Heinz Koch, Fellbach; Wolfgang Niechoj, Weinstadt; Theodor Grossmann, Bad Ditzenbach, and Felix Deffner, Esslingen, all of Fed. Rep. of Germany, assignors to Dailer-Benz Aktiengesellschaft, Stuttgart, Fed. Rep. of Germany

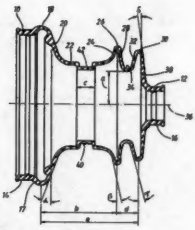
Filed Dec. 3, 1987, Ser. No. 128,182

Claims priority, application Fed. Rep. of Germany, Dec. 4, 1986, 3641393

Int. Cl.[4] F16D *3/84;* **F16J** *3/04, 15/52*

U.S. Cl. 277—212 FB **8 Claims**

1. Fold bellows made of resilient material for lubricated drive joints exhibiting large bend angles, which is adapted for fastening by collars provided on its end portions both to a drive shaft and also to an external circumference of a drive joint outer section and is provided with a configuration which avoids contact between folds, and contact between a fold and a drive means extending therethrough, while at the same time providing flexibility to the bellows to accommodate flexing of the drive means, and which exhibits adjacent one end portion and close to another end portion a respective fold, a constricted bellow section extending between said folds, said constricted bellows section being substantially cylindrical for an axial distance extending between said folds and which has ends which flare outwardly to meet said folds, wherein the fold adjacent the one end portion fastenable to the drive joint has the greatest diameter of all of the folds of the fold bellows,



wherein at least one further fold is provided on the substantially cylindrical constricted bellows section spaced axially from the flared ends of said constricted bellows section, and wherein the diameter of said further fold is smaller than the diameter of that fold close to the end portion fastenable to the drive shaft.

4,877,259

POWER-DRIVEN CHUCK

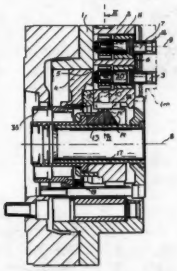
Günter H. Röhm, Sontheim, and Karl Pesch, Dillingen/Donau, both of Fed. Rep. of Germany, assignors to Günter Horst Röhm, Sontheim, Fed. Rep. of Germany

Filed Jan. 25, 1988, Ser. No. 147,716

Claims priority, application Fed. Rep. of Germany, Feb. 11, 1987, 3704135

Int. Cl.[4] B23B *31/16*

U.S. Cl. 279—123 **16 Claims**



1. In a power-driven chuck with a plurality of clamp jaws radially adjustable by a drive member, each of said clamp jaws comprising a jaw base operable by said drive member guided in a chuck body and a mounted jaw member removably attached to said jaw base and having at least one connecting pin with a pin axis parallel to the chuck axis which is mounted rotatable about said pin axis in said jaw base and which releases or makes a jaw member attachment between said jaw base and said mounted jaw member defined in the rotary position, at least one control rod guided longitudinally slidably in said jaw base transverse to said pin axis and a plurality of gear teeth coupling said control rod and said connecting pin with each other are provided so that the motion of said control rod relative to said jaw base converts into a rotation of said connecting pin and vice versa the improvement wherein the displacement of said

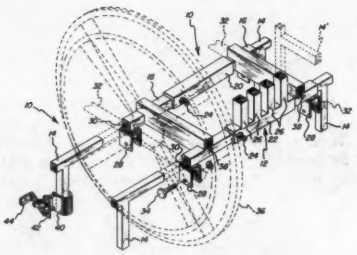
control rod in said jaw base runs parallel to the displacement of said jaw base in said chuck body, a controlling member is provided for said control rod by which said control rod is fixed in regard to said motion in said chuck body and said jaw base is slidable by said drive member with said control rod fixed to rotate said connecting pins.

4,877,260

ANTI-TIP WHEELCHAIR ACCESSORY

Frank S. Howland, 1187 Hillside Ave. 1 B9, Niskayuna, N.Y. 12309

Filed Nov. 30, 1988, Ser. No. 278,325
Int. Cl.[4] B62B *5/02*; A47C *1/02*
U.S. Cl. 280—304.1 **7 Claims**



1. A wheelchair anti-tip apparatus for mounting to the frame of the chair, and ready for rapid employment, comprising:

a base having defined front, rear and lateral portions adapted to receive insertable legs proximate the corners of said base, said base adapted for mounting to the lower frame of a wheelchair;

a plurality of legs removably insertable proximate said intersecting base portions, at least two of said legs disposed outward of the rim of the wheelchair main wheels when said base is attached to said chair and said legs are inserted therein; and

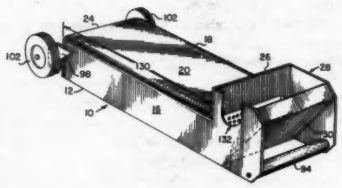
height adjuster means disposed on the bottoms of the front legs of said chair, whereby when at least four of said legs are installed in said base, which is attached to a wheelchair, and the front legs of said four are extended by said adjuster means, said chair's main wheels are lifted from the contact surface and said chair is suspended between said plurality of legs in an immobile anti-tip configuration.

4,877,261

FLUID WASTE TRANSPORTER

Gary J. Heisson, 86 Rockland Rd., Auburn, Mass. 01501

Filed Jun. 30, 1988, Ser. No. 213,777
Int. Cl.[4] B62B *1/10*
U.S. Cl. 280—47.26 **25 Claims**



1. Fluid waste transporter comprising:

(a) an elongated container having a hollow interior enclosed by walls on all sides, by a solid end wall at one end and by centrally open end wall at the other end, and provided with a chute at said other end, said chute being open at the top and in communication with said hollow interior via a central opening formed in said centrally open end wall;

(b) a perforated partition e-r mounted in said central opening of id centrally open end wall at said other end of said elongated container and in parallel spaced relation to said end wall, said perforated partition extending across a portion of said hollow interior and separating said hollow interior from said chute;

(c) said chute provided with a fill slot in one of its sides and formed with a front side disposed at an angle to both said perforated partition and said end wall, the free edge of said front side terminating in a reentrant lip;

(d) a first handle secure to said container adjacent said chute;

(e) a second handle secured to said container adjacent its said end wall; and

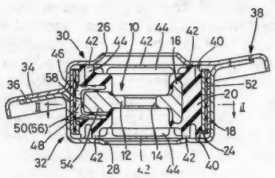
(f) a pair of wheels mounted to said container adjacent said second handle about an axis located in front of said end wall such that their peripheries in conjunction with said container adjacent said chute support said elongated container at an angle to ground downwardly inclined toward said first handle.

4,877,262

CYLINDRICAL UPPER SUPPORT FOR SHOCK ABSORBER

Haruhiko Tanahashi, Toyota; Yoshikazu Tsukamoto, Komaki, and Shinji Miyakawa, Inuyama, all of Japan, assignors to Tokai Rubber Industries, Ltd. and Toyota Jidosha Kabushiki Kaisha, both of Aichi, Japan

Filed Nov. 21, 1988, Ser. No. 274,340
Claims priority, application Japan, Nov. 27, 1987, 62-181781[U]
Int. Cl.[4] B60G *13/00*
U.S. Cl. 280—668 **11 Claims**



1. A cylindrical upper support interposed between a body of a vehicle and a piston rod of a shock absorber of the vehicle, for elastically connecting the vehicle body and the shock absorber, comprising:

a generally cylindrical or annular inner rigid member to which said piston rod of the shock absorber is fixed;

a generally cylindrical outer rigid member which is disposed radially outwardly of said inner rigid member and fixed to said body of the vehicle;

an elastic body interposed between said inner and outer rigid members for elastically connecting the inner and outer rigid members, said elastic body having two fluid chambers which are filled with a non-compressible fluid and which are formed in respective intermediate portions thereof as viewed in axial directions of said rigid members, said fluid chambers being opposed to each other in a diametric direction of said inner rigid member; and

one of said inner and outer rigid members having two wing members which extend in a substantially radial direction thereof into said two fluid chambers, respectively, such that each of said two fluid chambers is substantially divided by the corresponding wing member into two sections, and such that said corresponding wing member provides said each fluid chamber with a restricted part

through which said two sections communicate with each other.

4,877,263

HEIGHT CONTROL SYSTEM IN AUTOMOTIVE SUSPENSION SYSTEM WITH FEATURE OF CAPABILITY OF HEIGHT ADJUSTMENT IN LOCK CONDITION OF DRIVE WHEEL AND POWER TRAIN

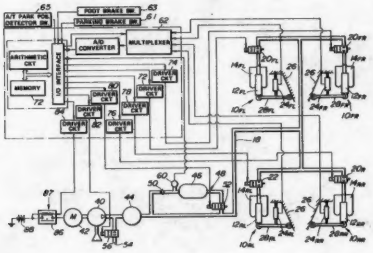
Junkichi Konishi, and Yasuhiro Shiraishi, both of Kanagawa, Japan, assignors to Nissan Motor Company, Limited, Yokohama, Japan

Filed Apr. 26, 1988, Ser. No. 186,223

Claims priority, application Japan, May 13, 1987, 62-71144[U]

Int. Cl.[4] B60G *11/26*

U.S. Cl. 280—707 **31 Claims**



1. A height control system for an automotive suspension system, comprising:

a suspension system disposed between a vehicle body and a suspension member rotatably supporting a road wheel, said suspension system including means for varying suspension force to be exerted between said vehicle body and said suspension member;

a sensor monitoring a relative distance between said vehicle body and said suspension member for producing a height indicative sensor signal;

a detector for detecting lock condition of said road wheel to produce a lock condition indicative signal; and

a controlling means for receiving said sensor signal, and checking the value of said sensor signal with respect to a predetermined value for deriving a control signal to operate said varying means to adjust said suspension force for maintaining said relative distance between said vehicle body and said suspension member at a desired value, said controlling means being responsive to said lock condition indicative signal to limit magnitude of height adjustment with a predetermined range.

4,877,264

ASPIRATING/VENTING AIR BAG MODULE ASSEMBLY

Jess Cuevas, Scottsdale, Ariz., assignor to Talley Automotive Products, Inc., Mesa, Ariz.

Filed Dec. 27, 1988, Ser. No. 290,495

Int. Cl.[4] B60R *21/28, 21/30*

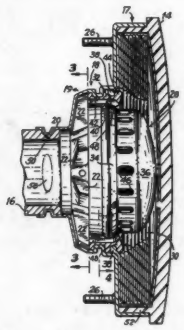
U.S. Cl. 280—731 **20 Claims**

1. An airbag module adapted for installation within a motor vehicle steering assembly, said module comprising:

(a) means for mounting a pyrotechnic gas inflator device upon a steering wheel portion of said steering assembly, said inflator device capable of producing a sufficient amount of a gaseous combustion product within a sufficient time to substantially deploy an inflatable air cushion located in contact relation therewith within an interval between a primary collision between said motor vehicle and an object external thereto and a secondary collision between an operator of said motor vehicle and an interior portion thereof, said mounting means comprising open pan means for supporting said pyrotechnic inflator device, said pan means having several stepped levels extending rearwardly thereon, wherein each said level has a substantially unvarying depth at any point thereon and is positioned directly over a next rearward one of said levels, said levels correspondingly decreasing in volume from front to rear upon said mounting means;

(b) first means, formed integral with a lower portion of said mounting means, for permitting a reciprocal flow of a quantity of surrounding ambient atmosphere from outside said motor vehicle through said mounting means and into said inflatable air cushion upon actuation of said inflator device to facilitate rapid inflation of said air cushion and to permit cooling of said gaseous combustion products produced by said inflator and, subsequent to said primary collision, to permit the contents of said air cushion to flow out of said interior portion of said motor vehicle to the surrounding atmosphere;

(c) a pyrotechnic inflator device positioned within said mounting means, said inflator device comprising a housing formed of a diffuser member having a first open end and a second closed end, and a closure plate member sealing said open end thereof, said housing further comprising an arcuate surface extending along at least a portion of an exterior peripheral surface thereof, said arcuate surface having a relatively greater diameter then a remaining portion of said housing and wherein said surface is configured and adapted to permit a locking engagement of said inflator device within said mounting means;



(d) means for retaining said inflatable air cushion in a contact relation with said inflator device, said retaining means having a first upper grooved portion and a second lower grooved portion extending along at least a portion of an outer surface thereof, wherein said retaining means is installed within said mounting means in surrounding relation to said diffuser member and configured to correspond to a portion of said arcuate surface thereof; and

(e) an inflatable air cushion in contact relation with said diffuser member of said inflator device, said cushion configured and adapted for preventing injury to said vehicle operator due to contact with said interior portion of said vehicle upon the occurrence of said primary collision, said cushion comprising means located within a mouth portion thereof configured to facilitate a locking engagement between said cushion and a first grooved portion upon an outer surface of said retaining means upon assembly of said module,

wherein at least a portion of said mounting means is lockingly engaged within said second grooved portion of said retaining means forming a structural seal therebetween such that said inflator device, said retaining means and said inflatable air cushion are all maintained together in

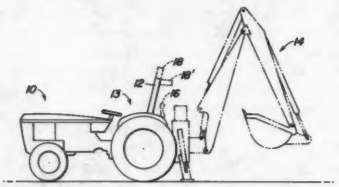
locking engagement with one another within said mounting means without the use of any additional locking means.

4,877,265

ADJUSTABLE HEIGHT VEHICLE ROLL-OVER BAR

Stanley J. DeBraal, West Bend, Wis., and Daniel R. Nickles, Monroe, N.Y., assignors to Deere & Company, Moline, Ill.

Filed Jul. 29, 1988, Ser. No. 226,253
Int. Cl.[4] B60R *21/13*
U.S. Cl. 280—756 23 Claims



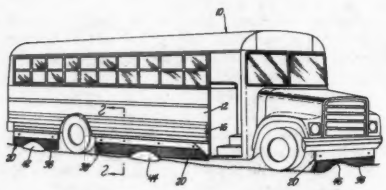
1. An adjustable roll-over bar comprising:
two substantially vertical members angled slightly towards one another;
a substantially horizontal cross-piece;
two extensions, each extension being selectively connectible to a corresponding one of said vertical members; and
two corner pieces, each corner piece having two legs, with one of said legs being connectible to an end of said cross-piece and the other of said legs being connectible to one of said extensions if said extensions are connected to said vertical members and to an upper end of one of said vertical members if said extensions are not connected to said vertical members, one leg of each corner piece being longer than the other leg by an amount sufficient to compensate for the difference in horizontal distance between the tops of said vertical members and the tops of said extensions when positioned on the vertical members.

4,877,266

VEHICLE SAFETY SYSTEM

Ronald C. Lamparter, Grosse Pointe Shores, and Robert J. Brown, Troy, both of Mich., assignors to Transpec Inc., Troy, Mich.

Filed Nov. 14, 1988, Ser. No. 270,943
Int. Cl.[4] B60R *13/04*
U.S. Cl. 280—762 5 Claims



1. A vehicle safety device of the type wherein the vehicle includes a body (10) having a side panel (12) with a lower edge portion (14) disposed about the periphery of the body, a device secured to the body and adapted to be lowered to substantially fill the space between the lower edge of the body and the ground, and a mechanism (34–36) for selectively raising and lowering said device, the improvement wherein said device includes

a. a rigid beam member (22) extending along said body edge, said member having upper and lower edge portion (24 and 26) generally parallel to the lower edge (14) of the body;

b. bracket means (28) pivotally supporting the upper edge portion (24) of the beam to the body proximate the lower edge (14) thereof,

c. flexible means (38) including upper and lower portions (39 and 41),

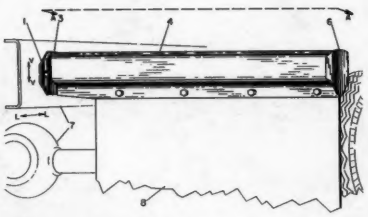
d. means (40) containing and securing the upper portion of the flexible means to the lower edge portion (26) of said beam member (22), said mechanism (34–36) being operatively connected to said beam member (22) and to a inner flange (32) of the bracket means (28) such that the flexible means is adapted to engage an object and tend to sweep it from beneath the vehicle as the device is pivotally lowered from a retracted position.

4,877,267

TRUCK MUD FLAP ARM

Charles F. Leonard, Rte. 1, Box 99, Star, Id. 83669

Filed Sep. 15, 1988, Ser. No. 245,703
Int. Cl.[4] B12B *9/16*
U.S. Cl. 280—848 7 Claims



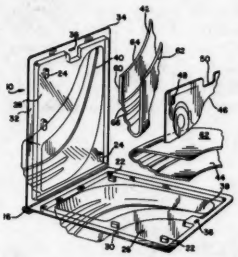
1. A mud-flap supporting assembly for mounting a mud-flap on a vehicle comprising:
a horizontally oriented, elongated tubular support arm for supporting said mud-flap, said support arm including means for attaching said mud-flap thereto;
a mounting plate for pivotally mounting said support arm at a first end thereof to said vehicle, said mounting plate adapted for providing pivotal movement of said support arm about a vertical and a horizontal axis adjacent said first end, said mounting plate including a first lug and a support platform supporting said first lug;
spring means disposed within said tubular support arm, a first end of said spring means connected to said first lug and a second end of said spring means connected to a second lug fixedly attached to a removable outside end cap disposed at a second end of said support arm, said second lug extending lengthwise into said tubular support arm, said spring means urging said support arm against said mounting plates with sufficient force to retain said support arm in a first position, said spring means allowing said support arm to pivot about said vertical and horizontal axes out of said first position, said spring means urging said pivoted support arm to return to said first position;
an end plate fixedly attached to said first end of said tubular support arm disposed between said tubular support arm and said support plate, said end plate having an aperture formed therein, said spring means extending through said aperture, said end plate having a flat end face portion in abutting engagement with and urged against said support plate by the action of said spring means, said support plate being flat at a major area of engagement with said end plate, said aperture being similar to and encompassing said support platform when said support arm is in said first position, said support plate having edge portions for engaging said end plate during pivoting of said support arm from said first position.

4,877,268

CUSTOM MOLDED VEHICLE SPLASH GUARD AND TEMPLATE PACKAGE THEREFOR

Robert A. Price, Glencoe, Ill., assignor to G-P Manufacturing Co., Inc., Chicago, Ill.

Filed Oct. 19, 1988, Ser. No. 259,868
Int. Cl.[4] B62D 25/16
U.S. Cl. 280—851 6 Claims



1. A custom molded splash guard package combination comprising:

at least a pair of left and right mirror image splash guards, said left splash guard being adapted for attachment to a fender on the left side of a vehicle, said right splash guard being adapted for attachment to a fender on the right side of a vehicle, each said splash guard having a display surface and a mounting surface, said display and mounting surfaces having a common outer edge and open inner edges and being disposed in spaced, generally parallel relationship to each other, said surfaces being joined along said common outer edge to form a pocket;

a blister package having a front portion and a rear portion, said portions adapted to be joined together along a common edge margin, each of said front and rear portions having a recess adapted to retain a respective one of said right and left splash guards therein, each of said recesses substantially resembling the configuration of a corresponding one of said display surfaces;

wherein each of said front and rear portions is adapted be used as a template for conforming the display surface of a respective one of said right and left splash guards for attachment to the respective vehicle fender.

4,877,269

BOARD BOOK FOR PRESCHOOL CHILDREN

Jean D. Callaghan, 1332 59th Pl., LaGrange, Ill. 60525, and Robert J. Lane, Lake Bluff, Ill., assignors to Jean Davis Callaghan, LaGrange, Ill.

Filed Nov. 24, 1987, Ser. No. 124,619
Int. Cl.[4] B42F 1/06; B42D 5/00, 1/08, 1/00
U.S. Cl. 283—40 7 Claims

1. In a board book for preschool children and having a front and a rear, said board book in its closed relation comprising:

a plurality of generally quadrilateral, essentially planar, panels of similar size and configuration, in side-by-side congruent relation,

with the panel of said panels forming the front of the book being the book front panel, and the panel of said panels forming the rear of the book being the book rear panel,

each of said panels defining a top edge, an outside edge, a bottom edge, and an inside edge.

means for binding said panels together at their inside edges forming the spine of said book and for connecting consecutive of said panels to said spine for approximately one hundred eighty degrees free swinging movement relative to said spine from positioning at one side of said spine to the other side of said spine to form the respective open relations of the book,

said book defining a top edging, an outside edging, a bottom edging, and an inside edging, with said spine being at said book inside edging,

with those of said book panels, following said book front panel, at their respective said outside edges and at the outside edging of said book, being consecutively progressively indented toward said book spine, through said rear panel, to define for each of said indented panels a recess edging exposing a panel turning surfacing portion of the panel preceding same in said book,

said panel turning surfacing portions being substantially aligned transversely of said book and comprising means for swinging the respective panels relative to said spine to provide the respective book open relations,

and with at least those of said book panels intermediate said book front and rear panels each defining a front face and a rear face each bearing indicia means for facilitating by observation preschooler sequential learning,

whereby, when the book in its closed relation is lying flat in an essentially horizontal disposed relation on said rear panel thereof, a preschooler to page through the book may consecutively swing said book panels to form the book consecutive open relations, starting with said front panel thereof, and down to said rear panel thereof, by manually and consecutively engaging the respective panel turning surfacing portions of the respective book panels, from one side of said book spine at least beyond an upright position relative to said book spine and allow such swung panel to fall flat on the other side of said spine, to dispose in substantial horizontal open book relation and expose for preschooler viewing said rear face of such swung panel and the front face of such next succeeding panel of said panels of the book, free of any manual hold down of any of said panels, free of any manual gripping by the preschooler of any of such swung panels, and free of any adult assistance in exposing said faces of said panels,

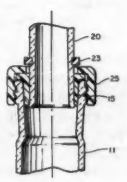
whereby such swung panel rear side, and such succeeding panel front side, in paging through the book, provide full spread areas bearing said indicia means that are consecutively openable for viewing by the preschooler paging said panels through the book from the front to the rear of the book.

4,877,270

CONNECTOR FOR TAPERED GLASS JOINTS

Edwin D. Phillips, 700 Cedar Ave., Middlesex, N.J. 08846

Filed Sep. 20, 1988, Ser. No. 246,735
Int. Cl.[4] F16L 49/00
U.S. Cl. 285—18 6 Claims



1. A connector for tapered glass joints, comprising:

a first section of glass tubing having a tapered, outwardly flared sealing surface formed on an inside surface of one

end thereof, and threads formed on an outside surface of said end;

a second section of glass tubing for connection to the first section, said second section having an end adapted to be inserted into said end of said first tubing section, and said end including a cylindrical portion with an outwardly flared terminal end defining a first retaining means;

a replaceable, resilient sealing sleeve for concentric sealing engagement between said ends of the first and second sections of glass tubing when said end of the second section is inserted into said end of the first section in coaxial relationship with the sealing surface thereof, said sealing sleeve maintaining said first and second sections of glass tubing in spaced, non-contacting relationship with one another, said sleeve having a cylindrical inner surface for sliding engagement with the cylindrical portion of said second section of glass tubing, and a tapered outer surface for mating engagement with the tapered portion of the first section; and

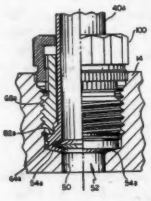
a cap having an internally threaded skirt for mating engagement with the threads on said end of the second tubing section and an end portion adapted to engage the sealing sleeve to force the sleeve into tight-fitting sealing engagement with the sealing surface in the first tubing section when the cap is tightened on the first tubing section, said outwardly flared terminal end of said second tubing section engaging said sealing sleeve to resist axial displacement of the second tubing section out of the first tubing section when the caP is tightened, and second retaining means engaged between the cap and the second tubing section to limit relative axial movement between the cap and said second tubing section for preventing the second tubing section from being displaced into said second tubing section.

4,877,271

HYDRAULIC CONNECTOR

Daniel J. McCorkle, Irvine, and Tai H. Do, Fountain Valley, both of Calif., assignors to Rexnord Inc., Torrance, Calif.

Filed Apr. 1, 1987, Ser. No. 32,700
Int. Cl.[4] F16L *35/00*
U.S. Cl. 285—39 **11 Claims**



1. A connector for connecting a tube, for carrying fluid, to an internally threaded parent material using a tube having an external flanged portion around an end portion of the tube to be connected to the parent material, the connector comprising:

a first member comprising:

a generally annular body means having upper and lower portions for encircling at least part of a tube,

external threads on only the lower portion of the body means, for threadedly engaging the parent material,

first means on the upper portion of the body means for engaging a second member,

a first substantially uniform surface on an interior portion of at least the upper portion of the body means for encircling the tube, and

a second surface in the lower portion of the body means separate from the first substantially uniform surface facing at least partly in a direction away from the upper portion of the body means for contacting an external flanged portion on a tube; and

a second member engaging and axially movable relative to the first member and comprising

second means on an interior portion of the second member for engaging the first means on the upper portion of the body means of the first member for substantially preventing relative rotational movement therebetween,

means on an external surface of the second member for axially engaging the parent material after the first member has been threaded at least partially into the parent material to substantially prevent rotation of the second member relative to the parent material, and

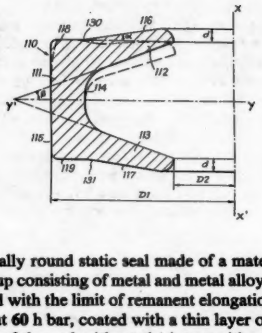
means for engagement with a removal tool for moving the second member away from the first member.

4,877,272

METAL STATIC SEAL AND ASSEMBLY COMPRISING SUCH A SEAL

Marc Chevallier, Tourny, and Guy Froger, Vernon, both of France, assignors to Societe Anonyme: Societe Europeene De Propulsion, Suresnes, France

PCT No. PCT/FR87/00100, § 371 Date Dec. 1, 1987, § 102(e) Date Dec. 1, 1987, PCT Pub. No. WO87/05978, PCT Pub. Date Oct. 8, 1987
PCT Filed Mar. 31, 1987, Ser. No. 143,080
Claims priority, application France, Apr. 1, 1986, 86 04610
Int. Cl.[4] F16L *17/06*
U.S. Cl. 285—111 **10 Claims**



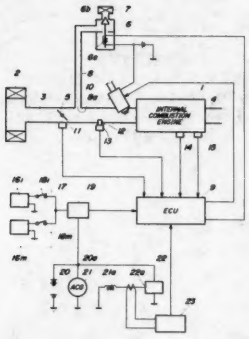
1. A generally round static seal made of a material selected from the group consisting of metal and metal alloys, presenting a unitary load with the limit of remanent elongation Re at least equal to about 60 h bar, coated with a thin layer of coating for the assembly of the seal without the interposition of a washer, having a longitudinal axis, and comprising an annular-part-forming slightly flexible semi-rigid bead and first and second wings connected laterally to the bead and extending transversely therefrom with respect to the axis of the seal, the seal presenting in axial half-section the form of a V lying on its side, the bead having two oppositely disposed planar lateral surfaces perpendicular to the axis of the seal, each wing having an outer tapered surface slightly inclined to its respective planar lateral surface of the bead and connected thereto in a gradual and regular manner to form a concave surface with a large radius of curvature, the wings and bead having an elasticity such that when the wings are flexed said bead flexes displacing said planar lateral surfaces, said wings outer tapered surfaces provide with the displaced planar lateral surfaces of the bead two sealing regions, the flexural capabilities of the wings being determined exclusively by the characteristics of the seal and remaining independent from outer connecting pieces cooperating with the seal.

4,877,273

OPERATION CONTROL SYSTEM FOR INTERNAL COMBUSTION ENGINES

Yoshio Wazaki, and Keisuke Kudo, both of Wako, Japan, assignors to Honda Giken Kogyo K.K., Tokyo, Japan

Filed Sep. 7, 1988, Ser. No. 241,700
Claims priority, application Japan, Sep. 8, 1987, 62-224811
Int. Cl.[4] F02D 29/06
U.S. Cl. 290—40 C 7 Claims



1. In a system for controlling an operation of an internal combustion engine having an AC generator mechanically driven by said engine and having a field winding, and at least one electrical load electrically driven by said AC generator, said system including first current detecting means for detecting value of electric current flowing in said field winding of said AC generator, control amount determining means responsive to the detected value of electric current from said first current detecting means for determining a control amount by which the operation of said engine is to be controlled, and output torque changing means responsive to the determined control amount from said control amount determining means for changing output torque of said engine,

the improvement comprising:

second current detecting means for detecting a value of electric current flowing from said AC generator to said at least one electrical load;

transient state detecting means for detecting a transient state of said at least one electrical load, based upon the detected value of electric current from said second current detecting means; and

transient correction amount determining means operable when said transient state is detected by said transient state detecting means, for determining a transient correction amount of the control amount determined by said control amount determining means, in response to the detected value of electric current from said first current detecting means.

4,877,274

TRIGGER LOCK CAM

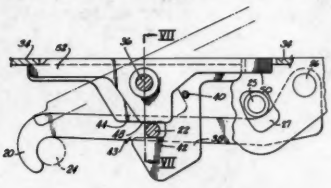
L. Richard Poe, Long Beach, Calif., assignor to The Hartwell Corporation, Placentia, Calif.

Filed Sep. 2, 1987, Ser. No. 92,001
Int. Cl.[4] E05C 5/00
U.S. Cl. 292—113 4 Claims

1. A latch handle assembly for securing a latch having a trigger pin comprising:

a handle pivotally joined to the latch;

a trigger latch pivotally joined to said handle and including a trigger opening engageable onto the trigger pin;



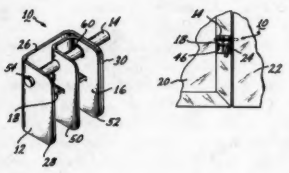
a cam pivotally joined to said handle, rotatable in relation to said handle and said trigger latch and engageable onto the trigger pin.

4,877,275

PROTECTED SLIDING BOLT LOCKING STRUCTURE

William DeForrest, Sr., 1825 Via Burton, Anaheim, Calif. 92806

Filed Jan. 19, 1988, Ser. No. 145,507
Int. Cl.[4] E05B 67/02
U.S. Cl. 292—148 18 Claims



9. A sliding bolt locking structure which comprises:

a housing, said housing including a back and left and right sides integrally formed with said back;

a guide element located on said housing between said left and right sides, said guide element including at least one lock shackle hole located in said guide element;

a member having left and right side panels, said member sized and shaped to fit in said housing between said respective sides of said housing, said left and right side panels spaced apart from each other a distance sufficient to allow positioning of a lock body between said respective side panels;

said member including a guide channel located in said side panels, said guide channel sized and shaped to fit onto and slide on said guide element whereby in a first position said shackle hole in said guide element is located between said left and right side panels of said member and in a further position said shackle hole is located exterior of one of said left or right side panels of said member;

at least one of said respective sides of said housing including a bolt hole; and

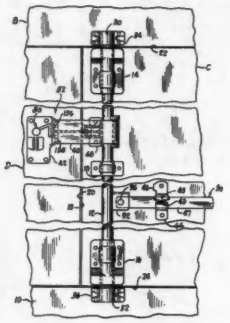
a bolt fixed to said member to move with said member, said bolt sized and shaped to project through said bolt hole in said one of said respective sides of said housing and to be movable in said bolt hole between extended and retracted positions in response to movement of said member on said guide element.

4,877,276

DOOR CONTROL MECHANISM

John V. Pastva, Parma Heights, Ohio, assignor to The Eastern Company, Cleveland, Ohio

Continuation of Ser. No. 804,885, Dec. 5, 1985, abandoned. This application May 27, 1987, Ser. No. 56,345
Int. Cl.[4] E05C 9/08
U.S. Cl. 292—218 9 Claims



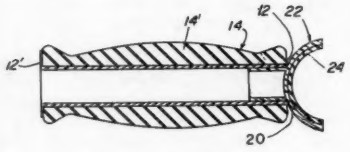
1. A door control mechanism for securing a swinging door in a closed position, said mechanism comprising a shaft having a vertical axis of rotation, bearing members adjacent to opposite ends of said shaft adapted to rotatably connect said shaft to a swinging door with the shaft axis of rotation spaced from and parallel with the pivotal axis of the door, door operating means attached to the shaft for oscillating said shaft about its longitudinal axis, discrete latch members secured to said shaft adjacent to opposite ends thereof, discrete keeper members adapted to be secured to structure adjacent to opposite edge portions of a door that extends transversely to the pivotal axis of the door, said keeper members being engagable with said latch members, and a discrete security locking means connected to said shaft intermediate the means for oscillating said shaft about its longitudinal axis and an upper end of said shaft, said locking means including a security latch member pivotably secured to said shaft for lateral movement between latched and unlatched positions upon movement with said shaft and means for engaging said pivoted latch having a first base part secured to a structure adjacent a door and a second part movably secured to the first part to engage an end of the latch member to block lateral movement of the latch member and thereby prevent rotation of said shaft by said door operating means.

4,877,277

LEVER ADAPTER FOR DOOR KNOBS

Norbert Leopoldi, Chicago, Ill., assignor to The Cloverline, Inc., Chicago, Ill.

Filed Sep. 19, 1988, Ser. No. 246,333
Int. Cl.[4] E05C 21/00
U.S. Cl. 292—347 8 Claims



1. A lever adapter for use with a door knob for converting linear movement of a hand to the rotary movement of the door knob, comprising:

an elongated lever having a first end and a second end;

said second end comprising a concave, arcuate member having a radius of curvature conforming to the radius of curvature of a door knob, and a layer of means for securing said arcuate member to a door knob;

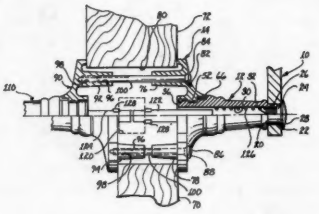
said elongated lever comprising an inner core member, and an outer, soft rubber-like member concentrically mounted about said inner core, whereby a hand may squeeze said lever.

4,877,278

RETAINER FOR DOOR HANDLE

Harold J. Valley, 2046 Badger Glen, Escondido, Calif. 92025

Filed Feb. 17, 1989, Ser. No. 312,953
Int. Cl.[4] E05C 21/00
U.S. Cl. 292—350 14 Claims



1. Apparatus for detachably attaching the end of a shaft extending from a door handle to an apertured rose having a passageway extending therethrough, said apparatus comprising in combination:

(a) a first threaded segment disposed proximate and about the end of the shaft;

(b) a second threaded segment disposed in the passageway of the rose for threadedly engaging said first threaded segment;

(c) a first annular groove disposed adjacent said first threaded segment and about the shaft for receiving said second threaded segment upon insertion of the shaft in the passageway of the rose and after said first threaded segment has been axially threadedly displaced past said second threaded segment;

(d) a second annular groove disposed adjacent said second threaded segment in the passageway of the rose for receiving said first threaded segment upon insertion of the shaft in the passageway of the rose and after said second threaded segment has been axially threadedly displaced past said first threaded segment; and

(e) journal means for rotatably supporting the shaft within the rose when said first threaded segment is in said second annular groove and said second threaded segment is in said first annular groove.

4,877,279

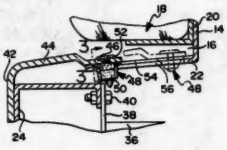
STROKING FASCIA FOR VEHICLE ENERGY ABSORBING BUMPER SYSTEMS

James L. Logan, Lansing, Mich., assignor to General Motors Corp., Detroit, Mich.

Filed Sep. 3, 1987, Ser. No. 92,762
Int. Cl.[4] B60R 19/08
U.S. Cl. 293—121 2 Claims

1. In an automotive vehicle having exterior body work, a bumper assembly operatively disposed at one end of said body work for stroking movement from an outer position away from said bodywork to an inner position adjacent to said body work, support structure means forming part of said vehicle, energy

absorbing means operatively connecting said bumper assembly to said support structure means for movement between said inner and outer positions to absorb energy of impact loads applied to said bumper assembly, a fascia covering said bumper assembly, said body work having a plurality of laterally spaced track means formed therein, each of said track means comprising a longitudinally extending channel recessed in said body work defined by opposing side walls with a bottom wall there-



between and longitudinally extending slot means extending completely through said bottom wall, slide assembly means connecting said fascia to said track means so that said fascia strokes with said bumper assembly in response to impact loads applied thereto, said slide assembly means comprising resilient push-in nut means extending through said slot means having a first portion slidably received within said channel and retainer means extending through said fascia into engagement with said slide nut means.

4,877,280

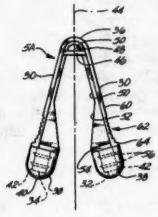
PAPER PICK-UP DEVICE

Reed Milano, 510 Valido Rd., Arcadia, Calif. 91006

Continuation of Ser. No. 859,045, May 2, 1986, abandoned, which is a continuation-in-part of Ser. No. 732,144, May 9, 1985, abandoned. This application Jun. 9, 1988, Ser. No. 208,843

Int. Cl.[4] A47J *43/28*; B25B *9/02*; B25J *1/02*

U.S. Cl. 294—99.2 **4 Claims**



1. A hand-sized pick-up device providing means for finger and thumb controlled manipulation of a plurality of sheets comprising:

(a) a first arm having a free end and a fixed end,

(b) a second arm having a free end and a fixed end,

(c) hinge means integrally joining together each of said fixed ends at a point defining an apex,

(d) a high-friction tip of a rubber-like material having a high tack attached to the free end of each arm, each tip having the form of a cap having an outwardly facing semi-spherical face portion whereby when the tips are placed against a stack of flexible paper sheets and the arms are squeezed together, a single sheet of paper is secured between the tips for lifting from the stack, and

e) a structural cross-member integrally formed with each arm near the apex defining an aperture between the cross-member and the apex and providing structural integrity and a pivoting fulcrum for each arm of the pick-up device adjacent the apex, each arm further including

a post portion integrally formed with the free end of the arm,

mounting means on the post portion for engaging the tip,

a flange extending longitudinally of each arm for providing structural reinforcement of the arm, and

a gusset integrally formed with the flange and post portion for providing structural reinforcement of the joint between each arm and the post portion.

4,877,281

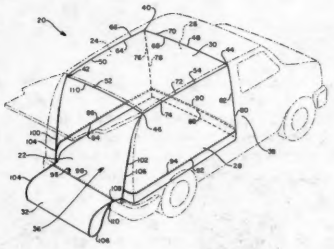
VEHICLE INTERIOR CARGO AREA LINER

Peter B. Altmann, 3111-6th Ave., Tacoma, Wash. 98406-6216

Filed Feb. 2, 1988, Ser. No. 151,519

Int. Cl.[4] B62D *25/00*

U.S. Cl. 296—39.1 **14 Claims**



1. A liner apparatus for covering and protecting a bed, a left and a right interior wall, a ceiling, a door, a threshold, and a bumper of a completely or partially enclosed cargo area of a vehicle, comprising:

(a) a floor appropriately dimensioned sit upon, cover, and protect a desired area of said bed;

(b) a left wall appropriately dimensioned to cover and protect a desired area of said left interior wall, said left wall being attached to said floor;

(c) a right wall appropriately dimensioned to cover and protect a desired area of said right interior wall, said right wall being attached to said floor;

(d) a front wall appropriately dimensioned to enclose a front end of said apparatus, said front wall being attached to said floor, said left wall, and said right wall;

(e) a roof appropriately dimensioned to cover and protect a desired area of said ceiling, said roof being attached to said front, right and left walls; and

(f) a gate attached to said floor, said gate being adjustably and removably secured to said left wall and to said right wall, said gate being capable of being adjustably raised or lowered, said gate serving as a tailgate having an adjustable height when raised and secured to said left wall and to said right wall, said gate at least partially losing an opening in said apparatus when said gate is raised, said liner supporting said gate at said adjustable height, said gate at least partially covering and protecting said threshold and said bumper when said gate is lowered.

4,877,282

FOLDABLE SEAT ASSEMBLY FOR MOTOR VEHICLE

Yoshihiko Yamauchi, Kanagawa Prefecture, Japan, assignor to Ikeda Bussan Co., Ltd., Ayase City, Japan

Filed Apr. 14, 1988, Ser. No. 181,761

Claims priority, application Japan, Apr. 17, 1987, 62-58339[U]

Int. Cl.[4] B60N *1/10*

U.S. Cl. 296—65.1 **9 Claims**

1. A foldable seat assembly comprising:

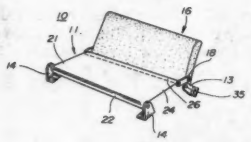
a first supporting structure;

a second supporting structure positioned apart from said first supporting structure;

a seatback pivotally supported by said second supporting structure so that said seatback is inclinable toward said first supporting structure;

a first link structure pivotally connected at one end thereof to said seatback;

a first frame member held by said first supporting structure;



a second frame member pivotally held by said first link structure; and

a cushion supporting member extending between said first and second frame members, said cushion supporting member dangling loosely when a distance between said first and second supporting members is reduced to a certain degree in response to the inclination of the seatback toward the first supporting structure.

4,877,283

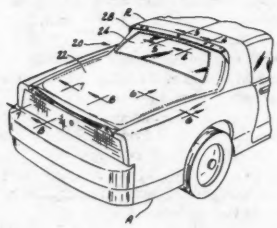
FLEXIBLE COVER AND SYSTEM FOR ENCLOSING AUTOMOBILE HATCH

Johnny L. Little, and Vernetta Little, both of 4883 Pine Needle, Florissant, Mo. 63033

Filed Sep. 28, 1988, Ser. No. 250,348

Int. Cl.[4] B60J 7/10

U.S. Cl. 296—100 **16 Claims**



1. A flexible cover system for enclosing the rear hatch opening of an automobile having a passenger compartment, an immovable roof structure over the passenger compartment and a hatch opening rearward of the immovable roof structure, the hatch opening providing communication between the passenger compartment and the environment outside the automobile and being defined by a hatch frame in the body of the automobile, the flexible cover system comprising:

a flexible water-impermeable sheet dimensioned for covering the hatch opening, the sheet having a peripheral edge margin;

securing means along at least portions of the peripheral edge margin of the sheet for securing the sheet tautly over the hatch opening and adjacent the hatch frame, the securing means being releasable only upon access to a designated portion of the peripheral edge margin; and

lockable access means for restricting access to said designated portion of the peripheral edge margin such that removal of the sheet from over the hatch opening is prevented when the access means is in a locked position and permitted when the access means is in an unlocked position, the securing means and lockable access means cooperating to prevent unauthorized removal of the sheet from over the hatch opening and unauthorized entry into the passenger compartment through the hatch opening in the absence of damage to the cover system or automobile.

4,877,284

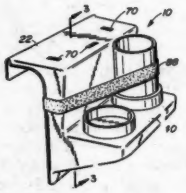
DEVICE FOR SUPPORTING OBJECTS ON A VEHICLE DOOR

Leland R. Doane, 1786 36th Ave., San Francisco, Calif. 94122

Continuation-in-part of Ser. No. 125,947, Nov. 27, 1987, Pat. No. 4,810,026. This application Nov. 28, 1988, Ser. No. 276,927

Int. Cl.[4] B60J 9/00

U.S. Cl. 296—153 **6 Claims**



1. A device for supporting objects on a vehicle door having a sill defining a slot and a door panel disposed below said sill, said device comprising:

a downwardly extending projection positionable within said slot;

a first support element connected to said projection and adapted to extend away from said slot and over and beyond said sill to a first location spaced from said slot, said first support element defining a first support surface;

a connector element attached to said first support element at said first location and extending obliquely downwardly therefrom, said connector element adapted to extend downwardly along said door panel and toward said door panel, said connector element having a distal end disposed below said first support element;

a second support element defining a second support surface, said second support element being attached to said connector element at a second location spaced from said first support element, said second support element adapted to extend away from said door panel, and said first and second support surfaces each being of a size and configuration to support objects on said vehicle door at different levels; and

spaced side walls attached to said connector element, said side walls adapted to extend toward said door panel when said projection is in said slot.

4,877,285

OPEN ROOF CONSTRUCTION FOR A VEHICLE

Johannes N. Huyer, Velserbroek, Netherlands, assignor to Vermeulen-Hollandia Octrooien II B.V., Netherlands

Filed Jun. 3, 1988, Ser. No. 202,529

Claims priority, application Netherlands, Jun. 25, 1987, 8701492

Int. Cl.[4] B60J 7/47

U.S. Cl. 296—216 **17 Claims**

1. An open roof construction for a vehicle having an opening in its fixed roof, comprising

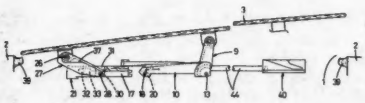
a stationary guide means provided on a side of the roof opening and extending in the longitudinal direction of the vehicle;

an adjustable panel having front and rear sides and closing the opening in the fixed roof in a closed position, and, by operating an adjusting mechanism, being capable of being

firstly pivoted from its closed position to a position inclining upwardly in a rearward direction and thereupon being slidably movable rearwardly into positions above the fixed roof;

a tilt out lever having lower and upper ends and being spaced from the front side of the panel, the tilt out lever being pivotally connected to the panel at said upper end;

a slide being slidably guided in the stationary guide means



and being adapted to be driven by a drive means, the slide and the tilt out lever being pivotally operatively connected; and a height adjusting means carrying a pivot shaft connected to the front side of the panel and comprising a tumbler coupled to the slide and adapted to tumble in a vertical longitudinal plane;

wherein said slide is a control slide not only positively controlling movement of the tilt out lever but also of the height adjusting means.

4,877,286

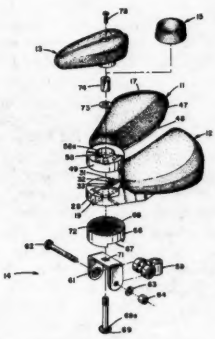
ADJUSTABLE WIDTH BICYCLE SEAT

Richard S. Hobson, Van Nuys, and David Potter, Los Angeles, both of Calif., assignors to J. B. Two Corporation, Minn.

Continuation of Ser. No. 054,613, May 27, 1987. This application Jul. 8, 1988, Ser. No. 217,054

Int. Cl.[4] B62J *1/00*

U.S. Cl. 297—195 **3 Claims**



1. A convertible bicycle seat comprising a support shaft, a first rider support platform, a second rider support platform, and means to adjustably secure the support platforms to said support shaft, said securement means being for secure positioning of said rider support platforms at any of selected angles with respect to each other, each of said rider support platforms including a forward ring portion that defines an opening through which said support shaft extends, said second platform support forward ring portion being superimposed over said first platform support forward portion, said support shaft having a threaded upper portion, said securement means comprising a threaded nut which is engaged with said threaded upper shaft portion to secure said first and said second rider support platforms in the selected of said angular positions, said set further including a horn portion and a button portion, one of said horn portion and said button portion being selectively secured over said threaded nut, one of said forward portions including at least one projection and the other of said forward portions including a recess for reception of said at least one projection thereby releasably locking said forward portions from rotational movement with respect to each other, one of said support shaft and said first platform portion including at least one projection and the other of said shaft and platform portion including recess means thereby locking said support platforms from rotational movement with respect to said shaft.

4,877,287

DEVICE FOR ADJUSTING THE POSITION OF AN ARMREST OF AN AUTOMOBILE VEHICLE SEAT

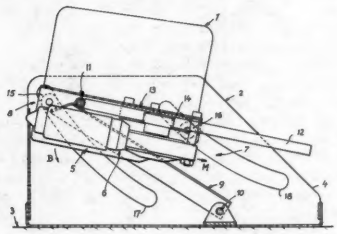
Gerard Escaravage, Valentigney, France, assignor to ECIA - Equipements Et Composants Pour L'Industrie Automobile, Audincourt, France

Filed Jun. 20, 1988, Ser. No. 208,615

Claims priority, application France, Jun. 19, 1988, 87 08633

Int. Cl.[4] A47C *7/54*

U.S. Cl. 297—417 **7 Claims**

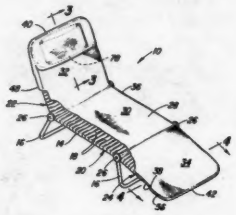


1. Device for adjusting the position of an armrest for an automobile vehicle seat, the armrest being movable between an active position of the armrest and a retracted position of the armrest which is substantially in a plane defined by the cushion of the seat with which it is associated, said device comprising a frame for fixing to the automobile vehicle and a support structure for the armrest which is movable relative to the frame between two positions for putting the armrest in said two positions of the armrest, a reversible motor-speed reducer unit drivingly connected to the support structure for shifting the support structure between said two positions of the support structure, and control means for controlling the motor-speed reducer until;

wherein the frame has a generally a U-shape having two branches between which branches the support structure of the armrest is movable, the support structure comprising the motor-speed reducer unit, means for shifting the support structure and guide means cooperative with complementary guide means associated with the branches of the frame, the motor-speed reducer unit being cooperative with the means for shifting the support structure and therefore the armrest between said two positions; and

wherein the means for shifting the support structure comprise an element constituting a rocker having one end articulated to the frame and another end, a rack which is guidedly movably mounted on the support structure, a gear pinion cooperative with the rack, an output shaft of the motor-speed reducer unit carrying the gear pinion for shifting the support structure and therefore the armrest between said two positions.

4,877,288
LOUNGE CHAIR COVER
Susan Lee, 1344 Laurel Valley, Pontiac, Mich. 48054
Filed Sep. 6, 1988, Ser. No. 240,549
Int. Cl.[4] A47C *31/11*
U.S. Cl. 297—229 **11 Claims**



1. A lounge chair cover for covering a conventional multiple position lounge chair of the type having a central seat portion supported on legs, a back support hinged to the seat portion and a leg support hinged to an opposite side of the seat portion, the supports and the seat portion each having a top and a bottom surface of webbing or the like, said covering comprising:

an elongated panel of fabric having a head end, a foot end and an intermediate section dimensioned to cover substantially the entire top surface of the back support, the leg support and the seat portion, respectively;

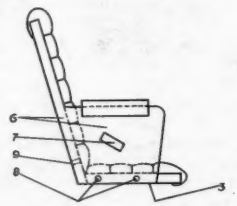
a pair of end flaps, each dimensioned to cover less than the entire surface area of the lower surface of one of the back support and the leg support;

means for securing each of said end flaps to an outermost portion of a respective one of said head and leg end of said panel, forming a pocket in each of said head and foot ends, said pockets being spaced apart and each having an open edge directed inwardly so that the back support and the leg support of the chair can be inserted through said open edges and into a respective one of said pockets;

a cover flap extending from said end flap; and

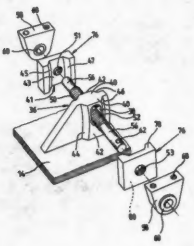
means defining a secret pocket disposed on an underside of said cover flap and having an opening directed towards said head end.

4,877,289
CART CAR CHAIR
Mauro Herrera, 11779 Francis Scobee, El Paso, Tex. 79936
Filed Jun. 23, 1988, Ser. No. 210,742
Int. Cl.[4] A47D *1/10*
U.S. Cl. 297—250 **2 Claims**



1. A shopping cart chair for children which consists of a chair seating part and a one piece back and side support part; said chair seating part is usable by itself or may be attached to the back and side support by means of screws to form a shopping cart chair that provides a stable and comfortable and safe restraint for children; said chair seating part having a cutout portion at its front center edge that allows the chair seating part to fit flatly in the shopping cart and wherein portions on each side of the cutout extend separately outward, outside and away from the shopping cart, and which are wide enough and long enough to provide a resting area for the child's legs; said shopping cart chair may, along with the child, be held in place on the shopping cart by means of a safety belt which passes through holes formed in said side support part.

4,877,290
ROCKER MECHANISM WITH A LOCKING FACILITY
Laszlo Schetl, Jönköping, Sweden, assignor to Swing-Matic AB, Jonkoping, Sweden
PCT No. PCT/SE87/00079, § 371 Date Sep. 20, 1988, § 102(e) Date Sep. 20, 1988, PCT Pub. No. WO87/04908, PCT Pub. Date Aug. 27, 1987
PCT Filed Feb. 17, 1987, Ser. No. 250,625
Claims priority, application Sweden, Feb. 19, 1986, 8600764-8
Int. Cl.[4] A47C *3/02, 3/00*
U.S. Cl. 297—270 **12 Claims**



1. A rocker mechanism provided with a locking arrangement for chairs provided with rocking seats, comprising an upper part connected to the seat to pivot or rock together therewith; an underpart pivotally connected to the upper part via a pivot shaft; and rocking means for firmly locking said parts in different tilt positions relative to one another, said locking means comprising a holder connected to one of the underpart and the upper part, and which presents an opening said holder having an opening elongated in the rocking direction, and a locking rod extending through said opening and disposed parallel with the pivot shaft, said rod being rotatably journalled in the other of said underpart and upper part, said rod being provided with a lefthand and a righthand screwthread at opposite sides of said holder opening respectively, and clamping plates having corresponding screwthreads mounted for co-action with said holder, characterized in that the holder engages each clamping plate through at least one promontory and at least one recess having a shape conforming to the shape of the promontory to form respective converging and diverging flank surfaces which form guiding and locking surfaces; said converging flank surfaces of the promontories for said clamping plates, in the tightened mode of the locking arrangement abutting opposing flank surfaces of the recesses in a wedging action, said flank surfaces being curved in the rocking direction with the centre of curvature located in the pivot centre of the pivot shaft.

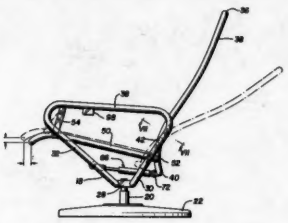
4,877,291
RECLINING CHAIR
William P. Taylor, 244 Lamplighter Cir., Winston-Salem, N.C. 27106
Continuation-in-part of Ser. No. 132,317, Dec. 14, 1987, abandoned. This application Nov. 1, 1988, Ser. No. 265,695
Int. Cl.[4] A47C *1/02*
U.S. Cl. 297—321 **8 Claims**

1. In a reclining chair including a base frame having spaced arm rest members disposed one at each side of the chair and at

least one laterally extending cross frame member rigidly connecting said arm rest members, a generally U-shaped seat frame having a front and opposed side members, a generally rectangular back frame having a top, a bottom, and opposed side members, pivot means mounting said back frame side members one on each of said arm rest members, hinge means pivotally connecting said seat side members to said back side members at points spaced below said pivot means and above said back frame bottom member, a pair of elongated link members having one end pivotally connected one to each of said arm rest members above said seat frame and the other end connected one to each of said seat frame side members, the improvement comprising

elongated fluid spring cylinder means having a first pin means pivotally connecting one end of said fluid spring cylinder means to a cross frame member beneath said seat frame at a position substantially equally spaced between said arm rest members,

second pin means pivotally connecting the other end of said



fluid spring cylinder to said back frame bottom member at a point substantially equally spaced between said back frame side members, said fluid spring cylinder normally urging said back frame to a full upright position and being compressible upon application of force to the chair back frame to move the chair back frame to a fully reclined position, the fluid spring cylinder having a predetermined fixed stroke which prevents pivotal movement of the seat back frame beyond the fully upright and fully reclined positions,

the ratio of the distance of said hinge means below said pivot means to the distance of said second pin means below said pivot means is within the range of about 0.5 to about 0.6, and

control means supported on one of said arm rest members and connected to said fluid spring cylinder, said control means being manually operable to selectively lock said air spring cylinder in any position of adjustment of the seat back frame between the fully upright and fully reclined position.

4,877,292

IMPROVED UNITARY DISPOSABLE CHAIR WITH COMFORT-CONTOURED INNER REINFORCEMENT

James R. Volpe, 2710 S. San Pedro St., Los Angeles, Calif. 90011, and James L. Kelley, 22461 St. Andrews Ave., Cupertino, Calif. 95014

Continuation-in-part of Ser. No. 947,645, Dec. 30, 1986, Pat. No. 4,811,987. This application Oct. 7, 1987, Ser. No. 106,055

Int. Cl.[4] A47C *4/00*

U.S. Cl. 297—440 **19 Claims**

1. A disposable chair that in a few seconds can be folded substantially flat for storage and shipment or unfolded and configured for use; said chair comprising:

four substantially contiguous and substantially rectangular panels of material that is of generally planar character, extended in only two dimensions and substantially very thin in a third dimension but sufficiently stiff and strong in the aggregate, when configured for use, to support a person; said four rectangular panels defining generally vertical edges of substantially equal length, which length is the overall height of the chair;

one pair of the four rectangular panels being mutually of substantially equal width, which is substantially the width of the chair when in use; one of the pair forming the back of the chair, and the other of the pair having portions that respectively form the front and seat of the chair;

another pair of the four rectangular panels being mutually of substantially equal width, which is substantially the front-to-back depth of the chair when in use; each of this other pair forming one of the sides of the chair;

said four rectangular panels being joined along substantially the entire lengths of their equal-length edges, the side panels alternating with the front and back panels to form an upstanding tube of substantially rectangular plan;

a fifth rectangular panel that is disposed erect within the tube, and that;

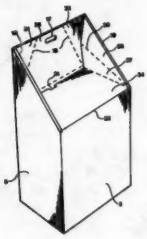
defines two vertical edges and a horizontal upper edge,

is joined along its two vertical edges to the two side panels, respectively,

is parallel and nearly equal in width to the front and back of the chair, and

is also of generally planar material that is sufficiently stiff and strong to significantly aid in supporting, and in distributing to the other four panels for support thereby, the weight of a person;

the seat-forming portion of the panel that forms the front and seat of the chair being folded downwardly and inwardly, with respect to the tube, against the back of the chair to be supported by the horizontal upper edge of the fifth panel;



each side panel being doubled over and inwardly, with respect to the tube, along a line extending generally from the top rear corner downward and forward to intersect the fold in the panel that forms the front and seat; and

upper portions of the side panels being adapted for folding along additional intermediate angled lines, to permit buckling deformation of the tube out of rectangular plan and thereby to facilitate folding of said seat-forming portion upward and outward relative to the tube for shipment and storage, or downward and inward relative to the tube for use;

wherein the height of the fifth panel defines the height of the seat panel above the bottom of the chair, and very generally equals the difference between the overall height of the chair and said front-to-back depth of the chair; and

further comprising an intermediate generally planar vertical strip interconnecting one vertical edge of the fifth panel with a vertical edge of a first one of the side panels;

said strip standing parallel to and in generally planar contact with said first one of the side panels and being of a width that is very generally half the front-to-back depth of the chair;

further comprising a generally vertical tab, unitary with the other vertical edge of the fifth panel, that secures said other vertical edge to a second one of the side panels, which is opposite the intermediate strip;

all of said five panels, the intermediate strip and the vertical

tab being formed of a single unitary blank, one of the four first-mentioned rectangular panels being at one end of the blank and the tab being at the other end of the blank; and

the panel that is at one end of the blank being secured to the intermediate strip; and

further comprising a stiffening-angle tab joined to the fifth panel along the horizontal upper edge of that panel, and folded backward and downward toward a generally horizontal orientation;

wherein the fifth panel and the stiffening-angle tab are unitary and are mutually demarcated by, in part, a transverse score along which they are mutually folded and by, in part, a generally transverse through-cut;

wherein the through-cut interrupts a segment of the score, and is at least in part offset from a projection of the score through that interrupted segment; and

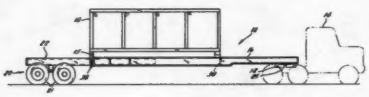
wherein the offset through-cut causes part of the fifth panel below the projection of the score through said interrupted segment to function as a part of the stiffening-angle tab and to be folded toward a generally horizontal orientation together with the rest of the stiffening-angle tab.

4,877,293

LOAD BRIDGING DUMP TRAILER

Paul H. French, Rte. 3, Box 135, and Craig P. French, Rte. 3, Box 135A, both of Suring, Wis. 54174

Filed Apr. 29, 1985, Ser. No. 728,200
Int. Cl.[4] B62D *21/14*
U.S. Cl. 298—17 R **13 Claims**



1. A cargo dump trailer comprising a substantially elongate trailer frame having a coupling means at one end for coupling the frame to the fifth wheel of a vehicle, a cargo box mounted on said frame at a spaced distance from said coupling means and a rear extension frame having an axle assembly mounted thereon, said extension frame being slideably mounted in said trailer frame for movement between a first position within said trailer frame under said cargo box to a second position rearwardly from said trailer frame with said axle assembly located a distance from said cargo box equal to the distance of said coupling means from said cargo box whereby the wheel loads at the fifth wheel and at the axle assembly will be substantially equal when said rear extension frame is in the second position.

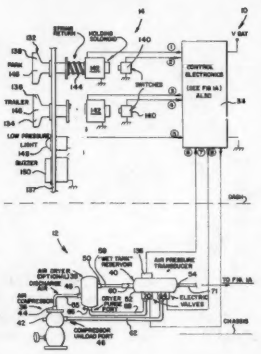
4,877,294

ELECTRO-PNEUMATIC TRACTOR-TRAILER BRAKE SYSTEM

Lawrence H. Kuhn, New Haven, and Michael B. Durant, Fort Wayne, both of Ind., assignors to Navistar International Transportation Corp., Chicago, Ill.

Filed Nov. 8, 1988, Ser. No. 268,426
Int. Cl.[4] B60T *13/68*
U.S. Cl. 303—9 **35 Claims**

1. In an automotive tractor which comprises road-engaging wheels which are suspended from a powertrain-containing chassis to support the tractor for over-the-road travel and via at least certain of which the powertrain-containing chassis imparts automotive motion to the tractor, a cab supported on said chassis containing an interior space for a driver of the tractor, pneumatic-operated service brakes and spring-operated parking brakes for at least some of said wheels, a pneumatic power supply mounted on said chassis, a pneumatic circuit coupling said pneumatic power supply with said service and said parking brakes, said pneumatic circuit comprising one branch which extends from said pneumatic power supply, through a service brake control valve disposed for operation by the driver, to said service brakes such that operation of said service brake control valve is effective to operate said service brakes, and another branch extending from said pneumatic power supply to said parking brakes, said pneumatic circuit further comprising valve means for exercising control over pneumatic-operated service and spring-operated parking brakes for road-engaging wheels of a trailer when such a trailer is coupled to said tractor for hauling and also over said parking brakes of said tractor, means coupling said valve means with said one branch such that the operation of the service brakes of such a trailer is slaved to the operation of said service brakes of said tractor via said valve means, and means coupling said valve means with said another branch such that the operation of said parking brakes of said tractor and of the parking brakes of such a trailer is effected via said valve means from a control which is on the interior of the cab and which is accessible to a



driver for selective operation of said parking brakes of said tractor and the parking brakes of such a trailer, the improvement which comprises said valve means being mounted on said chassis external to the interior space of said cab, and said control on the interior of the cab comprising an electrical control for selectively operating said parking brakes of said tractor and the parking brakes of such a trailer, said electrical control comprising electrical command means for operation by the driver, electrical circuitry coupling said electrical command means to said valve means, said valve means including an electric-actuated valve means portion to which said electrical circuitry is connected such that said electric-actuated valve means portion is under the control of said electrical command means, in which said electrical command means comprises two separate command devices, one for controlling the operating of solely the parking brakes of such a trailer and the other for controlling the operation of both the parking brakes of such a trailer and said parking brakes of said tractor.

4,877,295

ANTISKID CONTROL DEVICE

Masato Yoshino, Itami, Japan, assignor to Sumitomo Electric Industries, Ltd., Osaka, Japan

Filed Jul. 13, 1988, Ser. No. 218,257
Claims priority, application Japan, Jul. 16, 1987, 62-179337
Int. Cl.[4] B60T *8/68, 8/64*
U.S. Cl. 303—109 **8 Claims**

1. An antiskid control device for a vehicle having driven and undriven wheels comprising:

a wheel speed detecting means for detecting speeds of wheels of a motor vehicle;

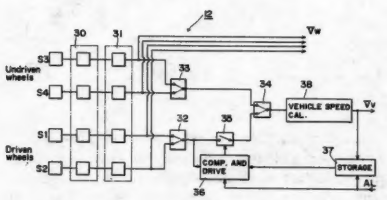
a vehicle speed estimating means for calculating a speed of a vehicle body of said motor vehicle on the basis of wheel

speed signals supplied from said wheel speed detecting means, said vehicle speed estimating means including:

a first comparator means for comparing the speeds of the wheels to select a higher wheel speed of the wheels, said first comparator means having a plurality of select-high comparators including a first select-high comparator which selects a higher wheel speed of the driven wheels, a second select-high comparator which selects a higher wheel speed of the undriven wheels, and a third select-high comparator which selects a higher wheel speed of the wheels,

a storage means for storing the speed of the vehicle body calculated at the time of the start of execution of antiskid control, and

a second comparator means for comparing the speed stored in said storage means with the higher wheel speed of the driven wheels which has been selected by said first select-high comparator of said first comparator means, said second comparator means enabling the higher wheel speed of the driven wheels to be output therefrom when the higher wheel speed of the driven wheels does not exceed the speed of the vehicle body stored in said storage means and execution of antiskid control has already started, and disabling the higher wheel speed of the driven wheels from being output therefrom when the higher wheel speed of the driven wheels exceeds the speed of the vehicle body stored in said storage means or execution of antiskid control has not yet started;



an arithmetic and locking detecting means, which performs arithmetic operations on the basis of signals supplied from said wheel speed detecting means and said vehicle speed estimating means, for issuing a first command of decreasing a brake pressure of the wheels when having detected that the wheels are in a state towards locking and issuing a second command of increasing the brake pressure, when having detected that the wheels are in a state towards recovery from locking, and

a solenoid driving means for driving a solenoid of a pressure control valve of a hydraulic circuit in response to the first and second commands from said arithmetic and locking detecting means;

wherein during nonexecution of antiskid control, said storage means and said second comparator means are not actuated, disabling the higher wheel speed of the driven wheels from being output, and a higher wheel speed of the undriven wheels is selected by said first select high comparator such that the speed of the vehicle body is calculated on the basis of said highest speed; while during execution of antiskid control, said storage means and said second comparator are actuated, enabling the higher wheel speed of the driven wheels to be output such that another highest wheel speed among the speeds of the undriven wheels and the higher wheel speed of the driven wheels lower than the speed stored in said storage means is selected by said first select high comparator such that the speed of the body is calculated on the basis of said another highest speed.

4,877,296

ANTILOCKING SYSTEM FOR A ROAD VEHICLE

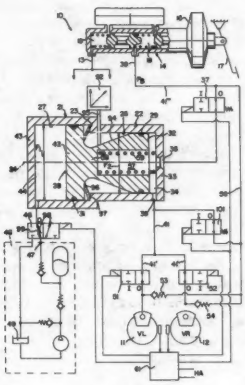
Heinz Leiber, Oberriexingen, and Reinhard Resch, Stuttgart, both of Fed. Rep. of Germany, assignors to Daimler-Benz Aktiengesellschaft, Stuttgart, Fed. Rep. of Germany

Filed Jul. 18, 1988, Ser. No. 220,168

Claims priority, application Fed. Rep. of Germany, Jul. 18, 1987, 3723875

Int. Cl.[4] B60T *8/42, 8/40, 13/68*

U.S. Cl. 303—115 **16 Claims**



1. An antilocking system for a road vehicle having vehicle wheels with a hydraulic multiple circuit wheel brake system, comprising:

at least one closed static brake circuit which is connected to at least one wheel brake from an output pressure space of a brake booster in which an output pressure proportional to an actuation force is generated;

the connection including an inlet valve means for connecting said brake booster to a primary chamber of a pressure modulator means having a pressure output line leading to said at least one wheel brake via at least one electrical 2/2-way solenoid controllable brake pressure control valve means for controlling pressure build-up, pressure reduction and pressure maintenance phases respectively of said antilocking control system;

said at least one wheel brake connected to or closed from said output of said primary chamber of said brake pressure control valve means;

said pressure modulator means having a hydraulically driven piston pump;

a drive pressure space connected to said pressure modulator means to displace said piston pump;

an electrically controllable ABS function control valve means connecting said drive pressure space alternatively to a pressure output of a hydraulic auxiliary pressure source and to its pressureless reservoir;

said piston pump separating said primary chamber from said drive pressure space;

said piston pump being displaceable by the pressure in said drive pressure space when said inlet valve is open;

said piston pump displacement being opposed by a powerful restoring spring and against pressure prevailing in said primary chamber;

said piston pump being displaced to an end position associated with a minimum volume of said primary chamber when said drive pressure space is connected to said auxiliary pressure source by said ABS function control valve means, and to another end position associated with a maximum volume of said primary chamber of action of said restoring spring, when said ABS function control

valve means connects said drive pressure space to said reservoir of said auxiliary pressure source;

said maximum volume expansion or minimum volume reduction of said primary chamber corresponding to between 25% and 50% of a volume of brake fluid quantity which is expelled by an actuation of said brake booster with the maximum force actuation which is applied into said brake circuit;

an electronic ABS control unit means for generating control signals required for the appropriate control of said ABS function control valve means and of said at least one brake pressure control valve in response to vehicle wheel speed proportional to output signals from vehicle wheel speed sensors associated with said vehicle wheels;

said inlet valve means operating as a change over solenoid valve which in a normal non-ABS brake mode, occupies a basic position connecting said primary chamber of said pressure modulator means to said pressure output of said brake booster;

said inlet valve means controlled by output signals of said ABS electronic control unit to an excited position closing off said primary chamber of said pressure modulator means from said pressure output of said brake booster, during pressure reduction as well as pressure build-up phases of said antilocking control system; and

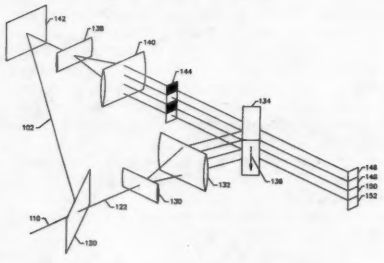
said inlet valve means being switched back to its basic position when said pressure modulator functions in a return feed mode at the same time as said brake pressure control valve means, connected to said modulator means, are switched back to excited positions.

4,877,297

RECONFIGURABLE OPTICAL INTERCONNECT USING DYNAMIC HOLOGRAM

Pochi A. Yeh, Thousand Oaks, Calif., assignor to Rockwell International Corporation, El Segundo, Calif.

Filed Apr. 29, 1988, Ser. No. 187,807
Int. Cl.[4] G02F *1/01*; G03H *1/02*
U.S. Cl. 350—3.68 **16 Claims**



1. A reconfigurable optical interconnect for coupling at least one input beam of coherent light into an array of light detectors, comprising:

a beam splitter for dividing each input beam into a probe beam containing a relatively small portion of the intensity of the input beam and a pump beam containing a relatively large portion of the intensity of the input beam;

a first cylindrical lens system positioned in the path of each probe beam for expanding each probe beam in a first direction perpendicular to the direction of propagation of the beam;

a second cylindrical lens system positioned in the path of each pump beam for expanding each pump beam in the first direction;

a spatial light modulator for varying the intensity of each expanded probe beam in the first direction; and

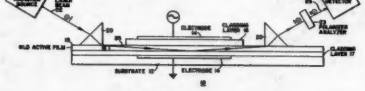
a photorefractive element positioned to receive each modulated probe beam and each expanded pump beam, the beams being oriented with respect to the photorefractive element and with respect to each other such that photorefractive two-wave mixing within the photorefractive element nonreciprocally transfers energy from each expanded pump beam to the corresponding modulated probe beam, each probe beam thereby being amplified before impinging on the detector array.

4,877,298

THIN FILM WAVEGUIDE ELECTROOPTIC MODULATOR

Chia-Chi Teng, Edison, and Dagobert E. Stuetz, Watchung, both of N.J., assignors to Hoechst Celanese Corporation, Somerville, N.J.

Continuation of Ser. No. 19,369, Feb. 26, 1987, Pat. No. 4,767,169. This application Jul. 5, 1988, Ser. No. 215,193
Int. Cl.[4] G02B *6/10*; G02F *1/35*
U.S. Cl. 350—96.14 **3 Claims**



1. A thin film waveguide electrooptic intensity modulation device comprising (1) a transparent optical waveguiding thin film on a supporting substrate, wherein the thin film comprises an organic polymer medium which exhibits nonlinear optical response, and the waveguiding thin film is laminated between two cladding layers which have a lower index of refraction than the cladded thin film; (2) a pair of optical input-output coupling means which are structurally integrated with the waveguiding thin film for coupling linearly polarized coherent electromagnetic radiation to the said thin film, wherein the coupling means are in spaced positions such that there is an optical phase shift between transverse electric mode and transverse magnetic mode of waveguided electromagnetic radiation which is an integral multiple of π and the output radiation is linearly polarized; and (3) a pair of elongated strip electrodes parallel to the waveguiding direction and situated in an intermediate zone between the positioned coupling means, and said electrodes are connected to a voltage source and are in a spaced proximity for application of a uniform electric field to the thin film waveguide; and wherein the device is adapted to modulate waveguided radiation by refractive index change in the waveguide medium in accordance with the following equations:

$$\Gamma = \Gamma_o + \delta\phi$$

$$\frac{I_o}{I} = \sin^2 \frac{\Gamma}{2}$$

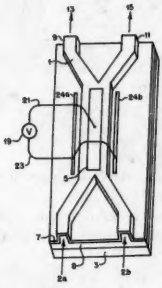
where Γ is the radiation phase retardation; Γ_o is the radiation phase retardation by the thin film waveguide medium; $\delta\phi$ is the radiation phase shift caused by the applied voltage; I is the input electromagnetic radiation signal; and I_o is the output electromagnetic radiation signal.

4,877,299

METAL-INSULATOR-SEMICONDUCTOR CONTROL OF GUIDED OPTICAL WAVES IN SEMICONDUCTOR WAVEGUIDES

Joseph P. Lorenzo, Stow, and Richard A. Soref, Newton Centre, both of Mass., assignors to United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Mar. 15, 1989, Ser. No. 323,736
Int. Cl.[4] G02B 6/10
U.S. Cl. 350—96.14 37 Claims



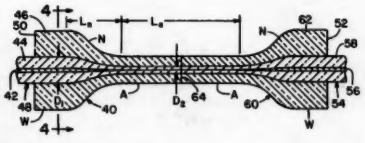
1. Apparatus for changing the refractive index of a light transmitting semiconductor waveguide comprising:
(a) a light transmitting doped semiconductor waveguide;
(b) an electrically insulating dielectric member in contact with and overlaying at least a portion of said waveguide;
(c) electrically conductive gate electrode means in contact with and overlaying at least a portion of said dielectric member; and
(d) voltage supply means coupled to said gate electrode means and to said waveguide for inducing depletion of mobile charge carriers within said light transmitting semiconductor waveguide.

4,877,300

NON-ADIABATICALLY-TAPERED CONNECTOR

Mark A. Newhouse; Daniel A. Nolan, and David L. Weidman, all of Corning, N.Y., assignors to Corning Incorporated, Corning, N.Y.

Filed Oct. 24, 1988, Ser. No. 261,270
Int. Cl.[4] G02B 6/26
U.S. Cl. 350—96.15 11 Claims



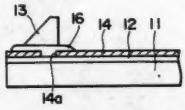
1. A mode field modifier for coupling light from a source positioned adjacent one of the ends thereof to a transmission optical fiber positioned adjacent the opposite end thereof, said mode field modifier comprising
a modifier core having a refractive index n_1,
cladding means surrounding said modifier core, the refractive index of said cladding means being less than n_1, and
a tapered region intermediate the ends of said mode field modifier, whereby said mode field modifier has a large diameter end and a small diameter end, the mode field of an optical signal propagating in one end of the modifier being modified as said signal propagates through said tapered region,
characterized in that said tapered region has a nonadiabatic taper, whereby a significant amount of mode coupling occurs therein and in that said mode field modifier further comprises an adiabatic region of sufficient length that the relative phases of the modes at the junction between said adiabatic and tapered regions have that relationship which is necessary to substantially couple the maximum possible amount of the energy from said source to the transmission optical fiber.

4,877,301

COVERED OPTICAL WAVEGUIDE HAVING AN INLET OPENING

Kiyoshi Yokomori, and Tami Isobe, both of Yokohama, Japan, assignors to Ricoh Company, Ltd., Tokyo, Japan

Filed Oct. 11, 1988, Ser. No. 255,702
Claims priority, application Japan, Oct. 9, 1987, 62-256089; Oct. 9, 1987, 62-256090
Int. Cl.[4] G02B 5/14
U.S. Cl. 350—96.19 29 Claims



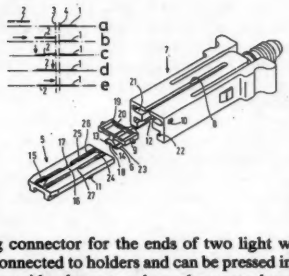
1. An optical waveguide device comprising:
an optical waveguide having a first index of refraction;
a cover layer formed on said optical waveguide at least partly from a dielectric material having a complex dielectric constant whose real component has a negative value, said cover layer being formed with an opening extending therethrough; and
an inlet coupler element fixedly attached to said cover layer covering said opening, said inlet coupler element having a second index of refraction which is higher than said first index of refraction,
whereby light incident upon said inlet coupler element is coupled into said optical waveguide through said opening.

4,877,302

PLUG CONNECTOR FOR THE ENDS OF TWO LIGHT WAVEGUIDES

Erich Schürmann, Sendenhorst, and Ulrich Grzesik, Bergisch-Gladbach, both of Fed. Rep. of Germany, assignors to U.S. Philips Corp., New York, N.Y.

Filed Apr. 8, 1988, Ser. No. 179,104
Claims priority, application Fed. Rep. of Germany, Apr. 9, 1987, 3711965
Int. Cl.[4] G02B 6/38
U.S. Cl. 350—96.21 30 Claims



1. A plug connector for the ends of two light waveguides which are connected to holders and can be pressed in the guide groove of a guide element and can be pressed against each other with their end faces by means of a longitudinal resilient element, wherein the guide devices are constructed so that at least one of the ends of the second light waveguide (2) can first

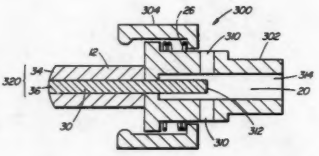
be moved with a free space over the guide groove over such a distance towards the other light waveguide (1) that a small axial distance remains between the end faces of the two light waveguides that one light waveguide (2) can then be pressed into the guide groove while maintaining said small axial distance, and by further movement of the pressed second light waveguide (2) in the guide groove a resilient engagement of the end faces of the two light waveguides (1, 2) to be connected is then obtained.

4,877,303

FIBER OPTIC CONNECTOR ELEMENT & METHOD FOR ITS USE

Kevin G. Caldwell, Kanata; Steve J. Lischynsky, and Elza V. Bagi, both of Ottawa, all of Canada, assignors to Northern Telecom Limited, Montreal, Canada

Filed Sep. 22, 1988, Ser. No. 247,465
Int. Cl.[4] G02B *6/38*; C03B *23/20*
U.S. Cl. 350—96.21 **17 Claims**



1. An optical fiber connector element for terminating an optical fiber cable, the connector element comprising:

a connector body having a passage extending therethrough, the passage having a forward portion for receiving an optical fiber and a rearward portion which is wider than the forward portion for receiving an optical fiber and surrounding protective material; and

an optical fiber stub secured within the forward portion of the passage, the optical fiber stub having a forward end surface which has an optical finish;

wherein the connector body has at least one lateral opening exposing a rearward end of the optical fiber stub for providing access to the rearward end of the stub by fusion splicing equipment; and

wherein the rearward end of the optical fiber stub is within the forward portion of the passage and the opening provides access to the forward portion of the passage.

9. A method for terminating a fiber optic cable with a fiber optic connector element, the method comprising:

providing an optical fiber connector element by:

providing a connector body having a passage extending therethrough, the passage having a forward portion for receiving an optical fiber and a rearward portion which is wider than the forward portion for receiving an optical fiber and surrounding protective material;

securing an optical fiber stub within the forward portion of the passage, the fiber stub having a forward end portion which extends beyond a forward end surface of the connector body;

trimming the forward end portion of the fiber stub at the forward end surface of the connector body to define a forward end surface of the fiber stub; and

polishing the forward end surface of the fiber stub to an optical finish; cutting the cable to a desired length;

stripping back an end portion of protective material surrounding an optical fiber of the cable to expose an end portion of the optical fiber; and

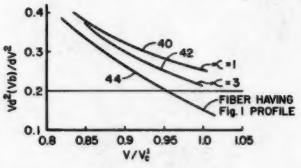
securing the exposed fiber end portion and an end portion of the protective material remaining on the fiber in the connector body passage with the fiber end portion in abutment and axial alignment with the fiber stub.

4,877,304

FEW-MODE/SINGLE-MODE FIBER

Venkata A. Bhagavatula, Big Flats, N.Y., assignor to Corning Incorporated, Corning, N.Y.

Continuation-in-part of Ser. No. 94,504, Sep. 9, 1987, abandoned. This application May 23, 1988, Ser. No. 197,594
Int. Cl.[4] G02B *6/02, 6/16*
U.S. Cl. 350—96.29 **45 Claims**



1. An optical fiber comprising

a core of transparent material having a maximum refractive index n_1 and a radius a, and

a layer of transparent cladding material on the outer surface of said core, the refractive index n_0 of said cladding being less than n_1,

said fiber being characterized in that the refractive indices n_1 and n_0, the radius a, and the refractive index profile of the core are designed such that

(a) $-\tau_j$, the difference between $|d(Vb)/dV|_j$, the normalized delay time of the jth mode and $|d(Vb)/dV|_0$, the normalized delay time of the fundamental mode, is less than about 5×10^{-2} over a range of V-values equal to about 10% of V near $V^{j+1}{}_c$, where j is an integer up to 2 and represents the highest order mode that is capable of propagating through said fiber, 0 represents the fundamental mode, b is the propagation constant and V is the normalized frequency, and $V^{j+1}{}_c$ is the normalized cutoff frequency of the j+1 mode, and

(b) the normalized waveguide dispersion $Vd^2(Vb)/dV^2$ is about equal to or less than 0.2 at V-values near $V^1{}_c$, the normalized cutoff frequency of the first higher order mode.

4,877,305

FIBER OPTIC LIGHT MODE MIXER

Robert H. Ricciardelli, 2213 Cottage Ct., Waukesha, Wis. 53188

Filed Mar. 9, 1988, Ser. No. 165,693
Int. Cl.[4] G02B *5/14*
U.S. Cl. 350—96.30 **6 Claims**

1. An apparatus for mixing modes of light transmitted through an optical fiber, comprising:

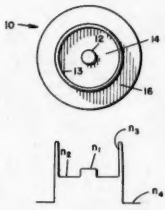
a length of single fiber optic material configured in a generally circular spiral shape, the spiral having at least two coils, each coil being splayed so as to be not co-planar with another coil.

4,877,306

COATED OPTICAL WAVEGUIDE FIBERS

Gitimoy Kar, Painted Post, N.Y., assignor to Corning Glass Works, Corning, N.Y.

Filed Sep. 30, 1987, Ser. No. 103,032
Int. Cl.[4] G02B 6/22
U.S. Cl. 350—96.33 17 Claims



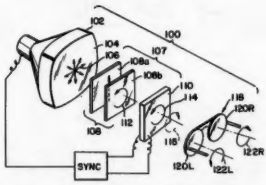
1. An optical waveguide fiber comprising:
(a) a glass core:
(b) a glass cladding which includes a layer in the region of its outer surface which has an index of refraction and an absorption coefficient which are greater than the index of refraction and the absorption coefficient of the remainder of the cladding; and
(c) a polymeric protective coating which is in direct contact with the outer surface of the cladding and which has an index of refraction which is less than the index of refraction of the layer and less than the index of refraction of the remainder of the cladding.

4,877,307

STEREOSCOPIC DISPLAY

Michael H. Kalmanash, Los Altos, Calif., assignor to Kaiser Aerospace & Electronics Corporation, Oakland, Calif.

Filed Jul. 5, 1988, Ser. No. 215,260
Int. Cl.[4] G02B 27/26; H04N 13/00
U.S. Cl. 350—132 17 Claims



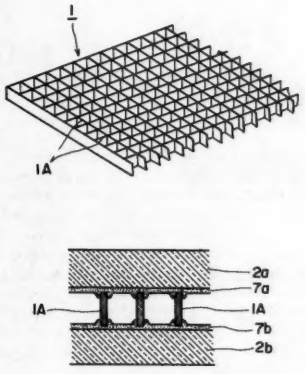
1. A stereoscopic display, comprising:
projector means for sequentially projecting, at a projection rate sufficient to avoid objectional flicker, alternate ones of successive pairs of substantially monochromatic images corresponding to right-eye- and left-eye-perspective views of a scene, each said image having a wavelength of about L_o;
variable polarizer means operated synchronously with said projector means for circularly-polarizing alternate ones of said images in each said pair in opposite senses; and
binocular eyewear, comprising:
a pair of circular polarizing elements having opposite senses, each said element containing a cholesteric liquid crystal material having a refractive index of about n and a pitch of about p, where $n \cdot p \approx L_o$, and
wherein said polarizing elements are each disposed within said eyewear to transmit corresponding ones of said polarized images to a corresponding eye, and to reflect oppositely-polarized ones of said images therefrom.

4,877,308

LIGHT SHIELDING SCREEN STRUCTURE AND A PROCESS FOR PRODUCING THE SAME

Osamu Okuno, Chigasaki, and Shigeru Sugiyama, Fuji, both of Japan, assignors to Asahi Kasei Kogyo Kabushiki Kaisha, Osaka, Japan

Filed Jun. 2, 1988, Ser. No. 201,467
Claims priority, application Japan, Jun. 24, 1987, 62-155511
Int. Cl.[4] G02B 27/00
U.S. Cl. 350—276 R 10 Claims

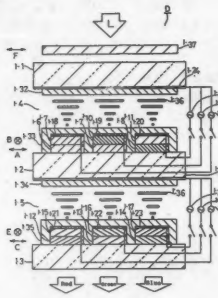


1. A light shielding screen structure comprising:
a first light transmissible substrate;
a second light transmissible substrate; and
a light shielding screen interposed between said first light transmissible substrate and said second light transmissible substrate,
said light shielding screen comprising a photocured resin composition layer and a plurality of apertures passing through said resin composition layer,
said apertures in said resin composition layer forming a perforated structure of a striped or sectioned pattern, in which said resin composition layer constitutes partition walls defining said apertures,
said apertures having their respective upper and lower openings respectively defined by the upper and lower ends of said partition walls,
the upper and lower end surfaces of said partition walls being connected respectively to said first light transmissible substrate and said second light transmissible substrate through a photocured adhesive layer, with part of the photocured adhesive layer which protrudes outwardly from the areas of the upper and lower end surfaces of said partition walls forming a fillet in each aperture at a corner portion which is defined by the inner wall of each aperture and the inner surface of each light transmissible substrate,
the connection between each partition wall and each light transmissible substrate having a peeling strength of 50 g/cm or more, and
said fillet having a width of not greater than 5 μm.

4,877,309
COLOR LIQUID CRYSTAL DISPLAY UNIT

Toshiaki Takamatsu, Yamatokoriyama, Japan, assignor to Sharp Kabushiki Kaisha, Osaka, Japan

Filed Dec. 8, 1987, Ser. No. 130,110
Claims priority, application Japan, Dec. 8, 1986, 61-292107; Feb. 10, 1987, 62-28560; Apr. 22, 1987, 62-99322; Jul. 13, 1987, 62-174439; Aug. 19, 1987, 62-205383
Int. Cl.[4] G02F *1/13*
U.S. Cl. 350—337 6 Claims



1. A color liquid crystal display device, comprising:

a first liquid crystal display cell having a liquid crystal material disposed between first and second substrates;

first and second color polarizers disposed over said second substrate, said first and second color polarizers each containing at least one color which is the complement of the color contained by the other color polarizer, and having polarization axes oriented at right angles to each other;

a second liquid crystal display cell having a liquid crystal material disposed between said second substrate and a third substrate and having picture elements aligned with said first display cell;

third and fourth color polarizers disposed over said third substrate, said third and fourth color polarizers each containing at least one color which is the complement of the color contained by the other color polarizer and which is different from the colors contained by said first and second color polarizers of corresponding picture elements, and having polarization axes oriented at right angles to each other; and

a neutral polarizer having a polarization axis parallel to a predetermined polarization axis of one of said first and second, and said third and fourth color polarizers, disposed on an incident light side of said first substrate.

5. A color liquid crystal display device, comprising:

a first liquid crystal display cell having a liquid crystal material diposed between first and second substrates;

a second liquid crystal display cell having a liquid crystal material disposed between said second substrate and a third substrate;

picture elements of said first and second display cells being aligned;

a pair of color polarizers disposed on each of said second and third substrates, each pair of color polarizers having polarization axes oriented at right angles to each other,

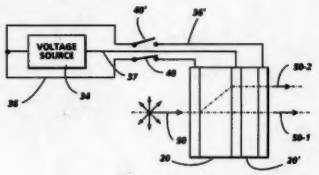
each of said pair of color polarizers disposed on said second substrate containing at least one color which is complementary to a color contained by a corresponding color polarizer disposed on said third substrate; and

a neutral polarizer having a polarization axis parallel to a predetermined one of said pairs of color polarizers disposed on an incident light side of said first substrate.

4,877,310
ELECTRONICALLY VARIABLE MTF FILTER FOR IMAGE SENSOR ARRAYS

Ned J. Seachman, Penfield; Joseph P. Taillie, Rochester, and Gary A. Dir, Fairport, all of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Filed Aug. 4, 1988, Ser. No. 228,077
Int. Cl.[4] G02F *1/13;* G02B *27/42*
U.S. Cl. 350—347 E 6 Claims



1. An image input scanner having at least one sensor array for scanning and converting images to electrical signals, and means providing an optical path for focusing image rays to the image being scanned on the array, the combination of:

(a) a birefringent MTF filter stationarily disposed in said optical path for filtering said image rays, said filter including

(1) a pair of transparent plates,

(2) a liquid crystal cell between said plates, and

(3) a transparent electrode between each of said plates and said liquid crystal cell,

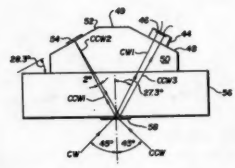
(b) a source of electrical potential adapted when coupled to said electrodes to switch said filter from a non-filtering state to a filtering state; and

(c) control means for selectively coupling said electrodes to said source of electrical potential to filter said image rays.

4,877,311
LASER POWER MONITORING OPTICS FOR A RING LASER GYROSCOPE

Donald I. Shernoff, White Plains, N.Y., assignor to Kearfott Guidance & Navigation Corporation, Wayne, N.J.

Filed Jan. 19, 1988, Ser. No. 145,021
Int. Cl.[4] G01C *19/64*
U.S. Cl. 356—350 10 Claims



1. In a ring laser gyroscope assembly having a plurality of mirrors, a monitor assembly for monitoring the power of two laser beams circulating in a cavity along one axis of the gyroscope assembly, the monitor assembly comprising:

beam combiner means including multiple facets mounted on a light transmissive block, the light transmissive block having a mirror means attached coplanarly to a surface thereof opposite the surface onto which the beam combiner means is mounted, the laser beams circulating within the cavity striking and refracting through the mirror means;

photodetector menas mounted on a first facet of the beam combiner means for directly intercepting one of the beams refracting thorugh the mirror means, the photodetector

means measuring the power of the directly intercepted beam; and

reflective means mounted on a second facet of the beam combiner means for intercepting the other of the beams refracting through the mirror means, and for reflecting the thus intercepted other beam back to the mirror means, the mirror means reflecting the reflected other beam toward the photodetector means;

wherein the photodetector means, upon impingement thereat of the twice reflected other beam, measures the power of the other beam and sums the same with the measured power of the directly intercepted beam; and

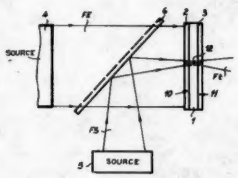
wherien the second facet is so angled that the reflective means mounted thereon reflects the other beam back to the mirror means at a position thereat which is different from the position at which it and the directly intercepted beam refracted through so that the directly intercepted beam and the other beam strike said photodetector means at diverging angles.

4,877,312

BISTABLE OPTICAL PHOTOREFRACTIVE CRYSTAL DEVICE

Jean P. Huignard, Paris, and Jean P. Herriau, Bures Sur Yvette, both of France, assignors to Thomson-CSF, Paris, France

Filed Dec. 8, 1987, Ser. No. 130,176
Claims priority, application France, Dec. 9, 1986, 86 17208
Int. Cl.[4] G02F *1/01*
U.S. Cl. 350—354 **5 Claims**



1. An optical bistable photorefractive crystal device including:

a photorefractive crystal with a first and a second face;

a first mirror applied to the first face;

a second mirror applied to the second face;

a first light source which emits a light beam illuminating the first face uniformly with a given intensity through the first mirror;

at least a second light source which emits a control signal beam of given intensity, also illuminating the first face through the first mirror and focused on a given portion of the photorefractive crystal so as to cause bistable switching of this photorefractive crystal portion.

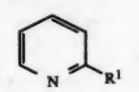
4,877,313

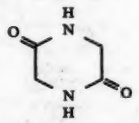
LIGHT-POLARIZING MATERIALS AND SUSPENSIONS THEREOF

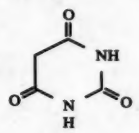
Robert L. Saxe, New York, and Robert I. Thompson, Plainview, both of N.Y., assignors to Research Frontiers Incorporated, Woodbury, N.Y.

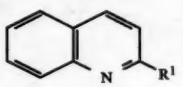
Continuation-in-part of Ser. No. 913,516, Sep. 30, 1986, abandoned, which is a continuation-in-part of Ser. No. 742,797, Jun. 10, 1985, abandoned. This application Feb. 10, 1989, Ser. No. 309,693
Int. Cl.[4] F21V *9/14*; G02B *5/22, 5/30*
U.S. Cl. 350—391 **16 Claims**

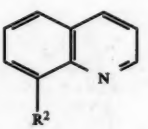
1. A light-polarizing material containing adsorbed iodine, comprising complex obtained by reacting (i) elemental molecular iodine, (ii) a hydrohalide acid and/or an ammonium or alkali metal or alkaline earth metal halide and (iii) a compound having the formula:


(I)


(II)

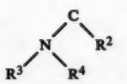

(III)


(IV)


(V)

or

A (VI)



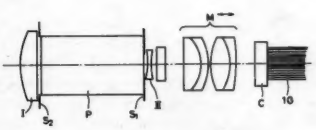
wherein R^1 is carboxy, hydroxy, 2-pyridyl or lower alkyl substituted by carboxy or hydroxy; A is alkylene forming with the depicted carbon atom a carbocyclic ring; R^2 is carboxy, hydroxy, or lower alkyl substituted by carboxy or hydroxy; and R^3 and R^4 are independently hydrogen or lower alkyl.

4,877,314

OBJECTIVE LENS SYSTEM FOR ENDOSCOPES

Iwao Kanamori, Tokyoto, Japan, assignor to Olympus Optical Co., Ltd., Tokyo, Japan

Filed May 24, 1988, Ser. No. 198,057
Claims priority, application Japan, May 25, 1987, 62-125859
Int. Cl.[4] G02B *15/06, 9/60, 9/62*
U.S. Cl. 350—422 **16 Claims**



1. An objective lens system for endoscopes having a field angle of 40° or smaller and comprising a first lens component

arranged on the extreme object side in said objective lens system and having positive refractive power as a whole;

a master lens arranged on the extreme image side in said objective lens system and having positive refractive power and comprising a lens component arranged on the extreme object side in said master lens and having positive refractive power and an aperture stop arranged between said first lens component and said master lens.

4,877,315

OPTICAL DEVICE

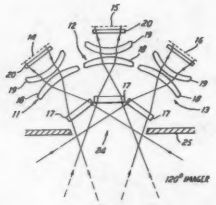
William R. Bradford, Camberley, England, assignor to Thorn Emi Electronics Limited, Hayes, United Kingdom

Filed Apr. 19, 1988, Ser. No. 183,245

Claims priority, application United Kingdom, Apr. 22, 1987, 8709526

Int. Cl.[4] G02B *13/06, 13/14*

U.S. Cl. 350—451 **8 Claims**



1. An optical device for panoramic viewing comprising a housing provided with an entry window, a plurality of spaced receptive areas and a lens system for each receptive area, each lens system being so disposed that it lies between the entry window and the associated receptive area, the lenses within each said system being arranged so that an image of a respective sector of a panoramic scene produced by radiation from the scene passing through the window is formed at each receptive area, at least part of the respective radiation beams entering each lens system crossing at the entry window.

4,877,316

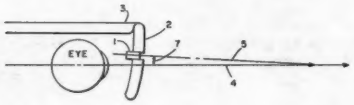
TELEMICROSCOPIC APPARATUS FOR SIGHTING AND BI-LEVEL VIEWING

D. Brandon Edwards; Bruce W. Edwards, both of Virginia Beach; Ian D. Howard, Norfolk, and Donald H. Ives, Chesapeake, all of Va., assignors to Edwards Optical Corporation, Virginia Beach, Va.

Filed Dec. 18, 1987, Ser. No. 134,794

Int. Cl.[4] G02B *23/00, 23/12*

U.S. Cl. 350—537 **25 Claims**



1. Telemicroscopic apparatus comprising a telemicroscope mounted to a carrier for positioning of the telemicroscope in front of a person's eye, the telemicroscope being of small outer diameter and mounted such that the person is able to view and perceive a principal image of an object and a clear magnified image of the object simultaneously, the telemicroscope being mounted to the carrier at an angle such that the telemicroscope's central viewing axis is angled relative to the proper central line of sight through the carrier, the end of the telemicroscope closest to the eye being displaced further from the central line of sight.

4,877,317

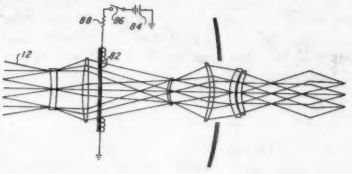
DUAL FIELD OF VIEW CATADIOPTRIC OPTICAL SYSTEM

Robert C. Gibbons, Richardson, and Wilbur W. Cottle, Plano, both of Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.

Division of Ser. No. 538,397, Oct. 3, 1983, abandoned. This application Feb. 27, 1987, Ser. No. 2,061

Int. Cl.[4] G02B *15/02, 23/04*

U.S. Cl. 350—559 **5 Claims**



1. A dual field of view optical system including a narrow field of view optical subsystem, a wide field of view optical subsystem and a relay subsystem common to said narrow field of view and wide field of view optical subsystems, comprising:

(a) said narrow field of view optical subsystem including a reflective objective system for forming a first focal plane, the reflective objective system including a primary reflector for reflecting radiant energy incoming thereto and a fixed optical element responsive to an external source of electrical power for reflecting radiant energy from said primary reflector towards the relay subsystem to form a first focal plane, said fixed optical element mounted in the optical path between said wide field of view subsystem and said optically refractive relay subsystem;

(b) said wide field of view optical subsystem including a refractive objective lens system for forming a first focal plane and including said fixed optical element which transmits the wide field of view light to said relay subsystem when said fixed optical element provides radiant energy transmission in response to an absence of supplied electrical power;

(c) said optically refractive relay subsystem common to the narrow field of view reflective objective system optical path and wide field of view refractive objective lens system optical path for forming an exit pupil, said exit pupil being a second focal plane at an accessible location, said optically refrative relay subsystem including an apertured means serving as a field stop for substantially eliminating the passage of any extraneous energy; and

(d) control means in the optical path between the narrow field of view optical subsystem and the wide field of view optical subsystem for controlling selectively the fixed optical element coupling of the narrow field of view optical subsystem or the wide field of view optical subsystem to the optically refractive relay subsystem;

(e) the control means for controlling selectively the optical coupling of the narrow field of view optical subsystem and the wide field of view optical subsystem to the optically refractive relay subsystem comprises an electrical means for converting the fixed optical element into one of a secondary reflector for blocking the wide field of view subsystem from the optically refractive relay subsystem and optically connecting the narrow field of view subsystem to the optically refractive relay subsystem; wherein

(f) the transparent reflector optical element changes from being a transparent to a reflector element with temperature and the electrical means includes an electrical heater mounted in close proximity to the transparent reflector

optical element and a circuit means for selectively providing power to the heater means whereby temperature is selectively changeable with the selectively providing of power to the heater means and thus the optical coupling of the narrow field of view optical subsystem and the wide field of view optical subsystem to the optically refractive relay subsystem is controllable.

4,877,318

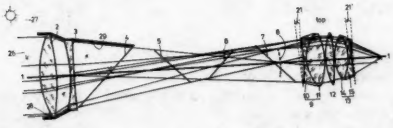
ULTRA-SHORT OPTICAL SYSTEM FOR BINOCULARS

John R. Miles, deceased, late of Glenview; by Mildred L. Miles, heir, 830 N. Glenayre Dr., Glenview, both of Ill. 60025, and Grant Miles, 2121 W. Cuyler Ave., Chicago, Ill. 60618

Continuation-in-part of Ser. No. 344,062, Jan. 29, 1982, Pat. No. 4,488,790. This application Aug. 22, 1984, Ser. No. 643,180

Int. Cl.[4] G02B *23/02, 27/40*

U.S. Cl. 350—569 **12 Claims**



1. An optical system for binoculars and telescopes having an air-spaced objective of extremely short focal length, a plurality of four ultra-thin, highly-reflective, lightweight, oval mirrors of varying size and a 9° Erfle type, 5 element eyepiece of extremely short focal length in which the first element of the objective is a double convex crown glass, **SK16**, 30 mm in diameter and 1.0 mm thick on the edge and 5.65 mm thick in the center, with the first radius 34.7410 mm and the second radius, −79.6844 mm; the second surface of the first element is separated by 5.48 mm from the first surface of the second lens, which is a double concave flint element of **SF1** glass 25.4 mm in diameter, with the first radius −47.5333 mm and the second radius 223.2772 mm; the distance to the first mirror from the second surface of the second lens along the optical axis is 13.4 mm; the distance from the first mirror to the second is 23.0 mm; the distance from the second mirror to the third is 83.4 mm; the distance from the third mirror to the fourth is 19.5 mm; the distance from the fourth mirror to the focal plane of the objective is 2.0 mm and from the focal plane to the first surface of the first achroat of the eyepiece is 9.8 mm; the first element of the eyepiece is a double concave flint element of **SF8** glass 19.0 mm in diameter, 4.8 mm thick on the edge and 0.96 mm in the center, with the first radius −76.3510 mm and the second radius 14.4100 mm and is cemented to the second crown element of **LaK21** rare earth glass of the same diameter, which is 1.0 mm thick on the edge and 7.3 mm thick in the center and has a second surface radius of −20.3100 mm; the second double convex crown element is spaced 0.1 mm from the first and is an **FK5** fluor crown glass 19 mm in diameter with the first radius 23.9800 mm and the second radius −60.6500 mm, 0.5 mm thick on the edge and 3.1 mm thick in the center and is separated by 0.1 mm from the first surface of the fourth element which is part of an achromat 15.6 mm in diameter; the first element of this doublet is a double convex crown element of **LaK21** rare earth glass, 1.0 mm thick on the edge and 5.1 mm thick in the center, in which the first radius is 15.8590 mm and the second radius is −14.9570 mm and this element is cemented to a double concave flint element of **SF7** glass of the same diameter, which is 3.6 mm thick on the edge and 0.8 mm thick in the center, the second radius being 26.5470 mm; the first and last doublets of the eyepiece are tapered to follow exactly the light rays and are thus cone-shaped lenses.

4,877,319

EXTERNAL MIRROR FOR A VEHICLE

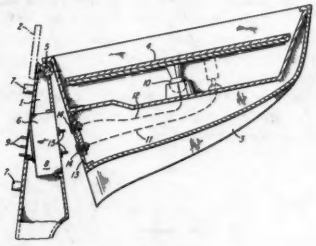
Bernhard Mittelhäuser, Am Krähenberg, D-3002 Wedemark 2, Fed. Rep. of Germany

Filed Apr. 22, 1988, Ser. No. 185,165

Claims priority, application Fed. Rep. of Germany, Apr. 23, 1987, 3713579

Int. Cl.[4] G02B *5/08*

U.S. Cl. 350—604 **8 Claims**



1. An external mirror for a motor vehicle, including a base that is to be secured to said vehicle, and a housing that is mounted on said base in such a way as to be pivotable about an approximately vertical axis, with said housing accommodating an adjustable mirror body; said mirror further comprising:

adjustment members connected to said mirror body to effect adjustment thereof; and

an electric motor that is mounted in said mirror base and is connectable to said adjustment members for operating same;

wherein said adjustment members are disposed in said housing include first connector elements connected to said adjustment members, and second connector elements connected electric motor, with said first and second connector elements being automatically disengaged from one another when said housing is pivoted away from said base, and with said first and second connector elements automatically engaging one another, to effect said connection between said electric motor and said adjustment members, when said housing is pivoted all the way in.

4,877,320

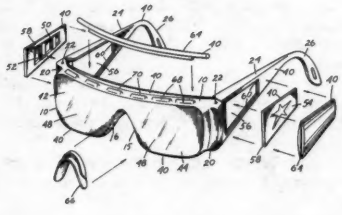
EYE-SHIELDING GLASSES

W. Bruce Holden, 500 Cohasset Rd., Ste. 34, Chico, Calif. 95926

Filed Oct. 3, 1988, Ser. No. 252,541

Int. Cl.[4] G02C *7/10, 11/02, 11/08*

U.S. Cl. 351—44 **16 Claims**



1. In eye-shielding glasses of a type having a pair of transparent lenses formed in a one-piece curved lens section narrowed centrally by a bridge opening and retained to a human face by ear hooking temples, improved glasses comprising:

circuitous framing edgewise along said lens section being a molded continuation thereof interfacing a concave surface

side of said lens section, said framing being a wide horizontal strip along the upper edge of said lens section ending longitudinally flanged upwardly into a short vertical lip, said framing being a narrow horizontal strip along the lower edge of said lens section widened into a frame for a nose rest along a semicircular bridge, said framing forming transversely along both shorter ends of said lens section into side shielding hinge housing having temple attachment apertures upwardly downwardly inside said side shielding hinge housing;

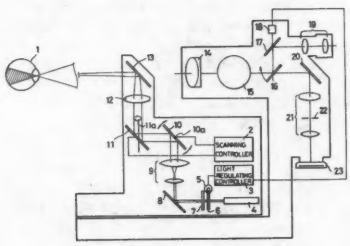
two temples each having ear hooks at distal ends thereof and oppositely widened into framed air vent web sections adjacent insert end members affixed with upwardly and downwardly positioned hinging attachment pins, said temples attaching inside said side shielding hinge housing and being and being snap-in and removable for replacement by various temples having a variety of designs in said framed air vent web section.

4,877,321

SLIT LAMP MICROSCOPE

Tadashi Ichihashi, and Masunori Kawamura, both of Tokyo, Japan, assignors to Kowa Company Ltd., Japan

Continuation of Ser. No. 059,735, Jun. 8, 1987, abandoned. This application Feb. 14, 1989, Ser. No. 311,424
Claims priority, application Japan, Jun. 6, 1986, 61-130060
Int. Cl.[4] A61B *3/10*
U.S. Cl. 351—214 **7 Claims**



1. A slit lamp microscope for observing the cornea, crystalline lens and other tissues of an eye, comprising:

a laser source for producing a laser beam;

a projector for projecting the laser beam onto an eye to be examined;

scanning means for scanning the laser beam vertically and horizontally within a selected area of the eye to be examined to form thereon a slit image which illuminates the selected area;

scanner controller means for varying scanning speed of the laser beam and varying the vertical and horizontal range of scanning;

optical means for receiving light scattered by the selected area of the eye to be examined; and

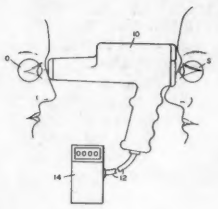
light regulating means for regulating the intensity of the laser beam to a predetermined level depending upon the quantity of light received by the optical means to obtain a substantially constant luminous intensity of the slit image irrespective of variations in the scanning image.

4,877,322

METHOD AND APPARATUS FOR MEASURING BLOOD OXYGEN LEVELS IN SELECTED AREAS OF THE EYE FUNDUS

Robert V. Hill, Portland, Oreg., assignor to Eyedentify, Inc., Portland, Oreg.

Continuation of Ser. No. 44,800, Apr. 30, 1987, abandoned. This application Aug. 22, 1988, Ser. No. 235,692
Int. Cl.[4] A61B *3/10, 5/00*
U.S. Cl. 351—221 **9 Claims**



1. The method of measuring the relative oxygen saturation of the choroidal blood of only a specifically selected area of the fundus of the eye of a subject, to the exclusion of any unselected area, comprising:

(a) providing a light source including incandescent light, pulsed red light of 620 –780 nm wavelength and pulsed infrared light of 840–930 nm wavelength,

(b) passing said light source through a field stop of dichroic masking material selected to block the passage therethrough of said pulsed red and infrared wavelengths and having an aperture positioned at the conjugate focus of the eye retina, the aperture being of predetermined geometry for outlining with sharply defined borders only a specifically selected area of the fundus,

(c) focusing the light source at the pupillary plane of the subject's eye and passing said light into the subject's eye to diffusely illuminate an area of the fundus and to form within said diffusely illuminated area a sharply defined image of said aperture on the fundus for positioning said aperture on the selected area of the fundus to the exclusion of any unselected area, the source and aperture light being reflected back out of the eye as a collimated beam of light,

(d) passing the collimated beam to an observer's eye for viewing of the eyegrounds of the eye of the subject,

(e) measuring the intensity of pulsed red light from the light source,

(f) measuring the intensity of pulsed infrared light from the light source,

(g) measuring the intensity of the pulsed red light from the reflected collimated beam,

(h) measuring the intensity of the pulsed infrared light from the reflected collimated beam,

(i) comparing the measured intensities of the pulsed red light of the light source and the pulsed red light of the collimated beam reflected from the eye, and

(j) comparing the measured intensities of the pulsed infrared light of the light source and the pulsed infrared light of the collimated beam reflected from the eye.

4,877,323

METHOD AND APPARATUS FOR INSPECTING A HIGH SPEED WEB

W. C. Stillwagon, 7610 Ball Mill Rd., Dunwoody, Ga. 30338

Continuation-in-part of Ser. No. 674,098, Nov. 23, 1984, abandoned. This application Jul. 7, 1986, Ser. No. 882,828
Int. Cl.[4] G01P *3/40*
U.S. Cl. 356—23 **17 Claims**

1. A method of inspecting a high speed printed web having

spaced repetitive impressions printed thereon, comprising the steps of:

translating said web past a flash tube assembly including at least one flash tube adapted to be stroboscopically excited and a photocell for sensing light transitions;

sensing at least one light transition in each printed impression on the portion of the web which passes said photocell;

generating an electrical signal for each sensed transition;

generating one strobe trigger pulse per repetition of the printed impression by dividing the frequency of occurrence of said generated electrical signals by the number of

transitions in the photocell sensed portion of one impression;

exciting said at least one flash tube with the trigger pulse to produce light flashes;

directing said light flashes to one surface of the web whereby a stroboscopic effect is produced to produce a virtually stationary image of the impression of the web ;

generating a steady stream of pulses proportional to the speed of said web;

counting the number of pulses of said steady stream of pulses between two contiguous strobe trigger pulses; and

storing the value of said number of counting steady stream pulses.

4,877,324

OPTICAL SIGHTING DEVICE WITH ILLUMINATED AIMING MARK

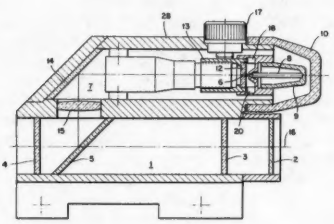
Bernhard Hauri, Staffelbach, and Hans Etter, Ueberstorf, both of Switzerland, assignors to Kern & Co. AG, Aarau, Switzerland

Filed Jul. 23, 1987, Ser. No. 76,854

Claims priority, application Switzerland, Jul. 23, 1986, 2926/86

Int. Cl.[4] G02B *23/10*

U.S. Cl. 356—251 **8 Claims**



1. Optical aiming device comprising:

first means for viewing a target field along an optical path, comprising a partiallyreflecting mirror, second means defining an aiming mark, comprising at least one first source of artificial light to illuminate said aiming mark, reflecting means for directing the artificial light of said first source to said aiming mark, and means for superimposing light from said illuminated aiming mark on the optical path from the target field via said partiallyreflecting mirror whereby the image of said aiming mark can be seen by an observer, viewing the target field, substantially at infinity, and means for moving at least one of said first source of artificial light, aiming mark and reflecting means with respect to the two other elements so that the illumination intensity of at least part of said aiming mark varies with such motion.

4,877,325

MACHINE COMPONENT ACCURACY MEASURING SYSTEM

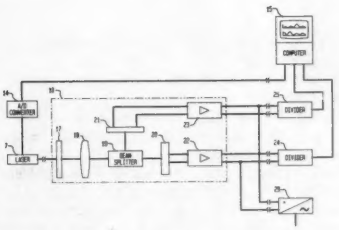
Hartmut Weule, Karlsruhe, and Bernhard Reichling, Rülzheim, both of Fed. Rep. of Germany, assignors to Polytec Gesellschaft für Analysen, Mess-& Regel- Technik mbH & Co., Waldbronn, Fed. Rep. of Germany

Filed Mar. 31, 1987, Ser. No. 33,074

Claims priority, application Fed. Rep. of Germany, Apr. 4, 1986, 3611209

Int. Cl.[4] G01B *11/00*

U.S. Cl. 356—373 **22 Claims**



1. A measuring system, to determine the accuracy of movement or position of a machine element, having

a laser beam generator (7) projecting a laser beam along a predetermined axis;

a measuring head (4) located on the machine element and including a first beam-impingement-position-responsive photo-detector (20) located in the path of the laser beam and providing first output signals representative of the location of beam impingement on the first photo-detector; and

a computer apparatus (15) receiving said first output signals and processing the signals,

said system comprising, in accordance with the invention,

a beam splitter (19) located in the measuring head and positioned in the path of the laser beam, and in advance of said first photo-detector (20) at a first distance,

the beam splitter splitting the beam into two beam portions and deflecting one of said beam portions out of said axis and in a direction at an angle with respect to said axis;

a second beam-impingement-position-responsive photo-detector (21) located in the path of said one deflected beam portion at a second distance relative to the beam splitter, said second distance being different from said first distance, said second beam-impingement-responsive photo-detector providing second output signals, said second output signals being received by the computer apparatus, and

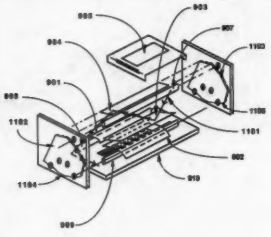
means for detecting rotation of said measuring head (4) about said predetermined axis;

said computer apparatus computing the deviation of the measuring head with respect to said beam, based on deviation, from a reference position, of said two beam portions on the first and second photo-detectors.

4,877,326
METHOD AND APPARATUS FOR OPTICAL INSPECTION OF SUBSTRATES

Curt H. Chadwick, Los Gatos; Robert R. Sholes, Ben Lomond; John D. Greene, Santa Cruz; Francis D. Tucker, III, Menlo Park; Michael E. Fein; P. C. Jann, both of Mountain View; David J. Harvey, Campbell, and William Bell, San Jose, all of Calif., assignors to KLA Instruments Corporation, San Jose, Calif.

Filed Feb. 19, 1988, Ser. No. 158,289
Int. Cl.[4] G01B *11/30*
U.S. Cl. 356—394 **56 Claims**



1. Inspection apparatus for inspecting surface features of a substrate comprising:

memory means for storing the desired features of the surface of the substrate;

focussed quasi-Lambertian illumination means for substantially uniformly illuminating a region of the surface of the substrate to be inspected;

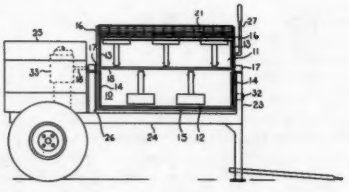
sensor means for imaging the region of the substrate illuminated by the illumination means; and

comparison means responsive to the memory and sensor means for comparing the imaged region of the substrate with the stored desired features of the substrate.

4,877,327
MORTAR MIXING DRUM

Marvin E. Whiteman, Jr., 2254 Braniff St., Bosie, Id. 83705

Filed Feb. 27, 1989, Ser. No. 315,914
Int. Cl.[4] B28C *5/12, 7/16*
U.S. Cl. 366—46 **17 Claims**



1. In an improved mortar mixer having a generally horizontally oriented cylindrical mortar drum with generally vertical and circular end walls, and paddle means rotatably and axially secured therein, and paddle rotation means, wherein the improvement comprises:

said drum being molded from a polyethylene material, said drum further having an elemental cylindrical segment opening through which material to be mixed may be deposited into or poured from said drum;

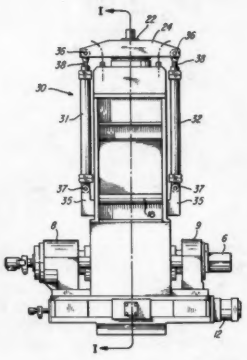
an elemental perimeter frame member positioned in elemental, external, contact with said cylindrical drum opposite the elemental segment opening; and

a pair of diametric end wall frame members each in diametric external contact with an end wall and attached to the corresponding end of the elemental perimeter frame.

4,877,328
INTERNAL MIXER

Friedhelm Müller, Freudenberg, and Klaus Ruthenberg, Ronnenberg, both of Fed. Rep. of Germany, assignors to Continental Aktiengesellschaft, Hannover, Fed. Rep. of Germany

Filed Apr. 12, 1988, Ser. No. 183,564
Int. Cl.[4] B01F *7/02, 15/02*
U.S. Cl. 366—76 **9 Claims**



1. In an internal mixer having a mixer housing in which are disposed mixing means and which has a charging opening that can be closed off by a floating weight, with a charging hopper being placed on said charging opening and being provided with at least one closeable filling opening, and with said floating weight being guided in an upwardly and downwardly slidable manner in said hopper, and being movable between various positions in said hopper via a hydraulic actuating mechanism that includes pistons, piston rods, and piston chambers, with a hydraulic control mechanism being associated with said hydraulic actuating mechanism, the improvement wherein:

said floating weight is connected to shaft means that is guided by guide means secured to said housing, with said shaft means being secured to a movable crosspiece; and

said hydraulic actuating mechanism includes only four hydraulic, double-acting cylinders for respective ones of said pistons, with said cylinders being disposed to the side of said hopper, and being symmetrically distributed about said shaft means of said floating weight, and with said cylinders each having two ends, with one end of each cylinder being secured to said crosspiece, and the other end of each cylinder being secured to one of said mixer housing and said hopper in such a way as to provide a certain amount of flexibility; said crosspiece includes two transverse supports, and said hydraulic actuating mechanism includes four hydraulic, double-acting cylinders that are connected in a paired manner to said traverse supports so that considerable forces acting upon the floating weight cannot lead to any swinging and tilting of said hydraulic actuating mechanism which thus avoids wear on said guide means and allows a lower overall installation height;

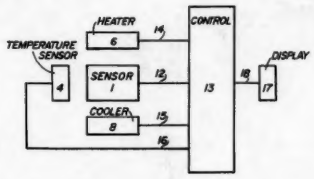
said hopper having a rectangular-shaped configuration; and

including a hydraulic cylinder means respectively at each of four corners of said rectangular-shaped charging hopper, said charging hopper at all four sides thereof respectively having a charging opening.

4,877,329
METHOD AND APPARATUS FOR MEASURING THE DEW POINT OF A GAS

Thomas Sauerbaum, Gross Grönau, and Stefan Kühning, Lübeck, both of Fed. Rep. of Germany, assignors to Draegerwerk Aktiengesell Schaft, Fed. Rep. of Germany

Filed Mar. 17, 1988, Ser. No. 169,409
Claims priority, application Fed. Rep. of Germany, Mar. 18, 1987, 3708697
Int. Cl.[4] G01N *25/68*
U.S. Cl. 374—28 4 Claims

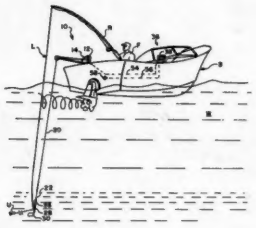


1. A method for measuring the dew point using a unit including a sensor which outputs a signal corresponding to a thickness of a dew layer on a surface exposed to the atmosphere to be examined, and a tempering device connected to the sensor including a heater and a cooler comprising the steps of: cooling and heating the sensor to bring the sensor to a temperature which leads to the formation of a dew layer on the surface of the sensor; detecting the dew layer by measuring the signal of the sensor; measuring the temperature of the sensor as the dew point temperature and calibrating the unit by heating the sensor surface to the point of completely drying the layer of dew, measuring the sensor output and comparing successive measurements of the sensor output to detect a zero rate of change of the sensor output corresponding to a zero point calibration value.

4,877,330
TEMPERATURE SENSING SYSTEM

Joseph J. Torre, Kalamazoo, Mich., assignor to Pacific Atlantic Products, Ltd., Kalamazoo, Mich.

Filed Feb. 5, 1988, Ser. No. 155,069
Int. Cl.[4] A01K *91/06;* G01K *7/00*
U.S. Cl. 374—136 26 Claims



1. A system for detecting the temperature at a first region of a fluid and for displaying an indication thereof at a second region, removed from the first region a continuously variable distance, the system comprising:

sensing means, locatable in the first region, for determining the temperature of the first region of the fluid and for providing an electrical current proportional substantially only thereto;

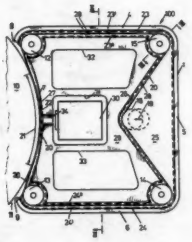
flexible, elongated, current conducting means electrically coupled to said sensing means, and extending between the two regions said current conducting means having a variable electrical impedance dependent, at least in part on the continuously variable distance between the two regions and

display means, coupled to said current conducting means, and positionable at the second region of fluid, for detecting said current independently of any changes in said impedance of said conducting means and for displaying an indication thereof.

4,877,331
APPARATUS FOR MEASURING THE TEMPERATURE OF THE SURFACE OF A ROTATING ROLL

Günter Schrörs, Tönisvorst; Bernhard Brendel, Grefrath, and Werner Hartmann, Krefeld, all of Fed. Rep. of Germany, assignors to Eduard Küsters Maschinenfabrik GmbH & Co. KG, Krefeld, Fed. Rep. of Germany

Filed Oct. 13, 1988, Ser. No. 257,350
Claims priority, application Fed. Rep. of Germany, Oct. 8, 1987, 3734018
Int. Cl.[4] G01K *13/08, 1/16*
U.S. Cl. 374—153 21 Claims



1. Apparatus for measuring the temperature of a surface of a rotating roll comprising:

(a) a roll rotatable about a longitudinal axis and including a surface having a temperature to be sensed;

(b) a temperature sensor comprising a radiation sensor directed toward the roll surface; and

(c) a belt disposed between the roll and the temperature sensor that abuts against the roll surface in a looping region to transmit heat from the roll to the temperature sensor, said belt being supported for endless revolution and revolving in a closed loop path such that its longitudinal axis lies in a plane perpendicular to the longitudinal axis of the roll and wherein said temperature sensor measures heat radiated from the roll without contacting the roll and the belt

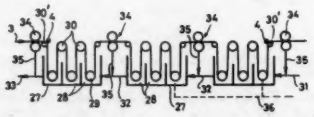
4,877,332
TRANSDUCER FOR DETERMINING CONTAMINATIONS IN FABRICS

Wouter D. Ravensbergen, Leiderdorp, Netherlands, assignor to Yokogawa Electrofact B.V., Amersfoort, Netherlands

PCT No. PCT/NL87/00021, § 371 Date May 9, 1988, § 102(e) Date May 9, 1988, PCT Pub. No. WO88/02113, PCT Pub. Date Mar. 24, 1988
PCT Filed Sep. 10, 1987, Ser. No. 207,048
Claims priority, application Netherlands, Sep. 18, 1986, 8602368
Int. Cl.[4] G01K *17/08;* G01N *25/18*
U.S. Cl. 374—153 10 Claims

1. A transducer for use in apparatus for determining the concentration, in fabrics, of contaminants in the fabrics which affect the conductivity of the fabrics, wherein said transducer contacts a web of fabric being tested and produces an output signal related to the conductivity of the fabric and wherein said apparatus includes a measuring circuit, including a conductiv-

ity meter, connected to said transducer, said transducer comprising a measuring roller made of insulating material including two electrode rings separated from each other by said insulating material and being disposed so as to smoothly join the insulating surface of said roller, said roller being rotatably supported by support means and including a rotation shaft



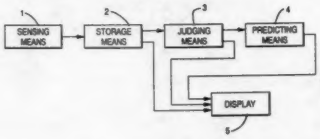
provided with slip rings by means of which the electrode rings are connected in the measuring circuit of said conductivity meter, said transducer further comprising spring means acting on said support means for pressing said roller with predetermined force against a guiding roller for guiding the fabric web, said guiding roller being provided with an insulating surface.

4,877,333

ELECTRONIC THERMOMETER

Hiroyuki Ota, Takatsuki, and Isao Kai, Kameoka, both of Japan, assignors to Omron Tateisi Electronics Co., Nagaokakyo, Japan

Filed Jan. 16, 1987, Ser. No. 3,988
Claims priority, application Japan, Jan. 16, 1986, 61-7566
Int. Cl.[4] G01K *7/00*
U.S. Cl. 374—169 **5 Claims**



1. An electronic thermometer, comprising:
sensing means for sensing a temperature to be taken by the thermometer;
storage means for storing said sensed temperature from said sensing means;
judging means for judging whether said sensed temperature is changing within a predetermined range of change;
predicting means for predicting a steady temperature based on said sensed temperature, wherein the operation of the predicting means is conditioned on said judging means judging that said sensed temperature is changing within the predetermined range of change; and
displaying means for displaying said sensed temperature or said steady temperature predicted by said predicting means.

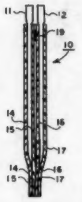
4,877,334

INFLATABLE BAG

Dennis Cope, 1621 Westminster Dr., Apt. 210, Naperville, Ill. 60540

Filed Aug. 29, 1988, Ser. No. 237,340
Int. Cl.[4] B65D *30/00*
U.S. Cl. 383—3 **7 Claims**

1. An inflatable bag, comprising in combination a first sheet of a gas impervious flexible material, a second sheet of a gas impervious flexible material,
said first and second sheets being sealably joined together to provide a first sealed chamber disposed between said first and second sheets,
a first inflation tube means extending into said first sealed chamber between said first and second sheets for inflating said first chamber,
a third sheet of a gas impervious flexible material
a fourth sheet of a gas impervious flexible material,
said third and fourth sheets being sealably joined together to provide a second sealed chamber disposed between said third and fourth sheets,
a second inflation tube means extending into said second chamber between said third and fourth sheets for inflating said second chamber,
said first and second inflation tubes being mutually adjacent to permit a person to blow into both of said tubes simultaneously,



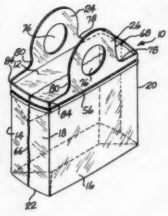
first and second check valve means respectively incorporated in said first and second inflation tube means internally of said first and second compartments for preventing the flow of gas from said first and second chambers through said first and second tube means,
said second and third sheets being bonded together to partially enclose a third chamber located between said second and third sheets to receive one or more articles to be bagged, and
locking means for locking said second and third sheets together to complete the enclosure of said third chamber.

4,877,335

CARTON LOOK PLASTIC BAG WITH EAR HANDLES

Delbert J. Barnard, Federal Way, Wash., assignor to Cello Bag Company, Inc., Seattle, Wash.

Filed Dec. 19, 1988, Ser. No. 286,454
Int. Cl.[4] B65D *33/06*
U.S. Cl. 383—6 **12 Claims**



1. A plastic bag, comprising:
a bag web of thermoplastic material folded laterally on itself to form front and rear panels, a top gusset between the panels at one end of the bag, and a fill opening at a second end of the bag, said panels having parallel side edges, and said top gusset having end edges colinear with and positioned between upper portions of the side edges of the panels when the bag is flat and unfilled;
side seals connecting the side edges of the panels together, and further connecting the end edges of the top gusset together and to the upper portions of the side edges of the

panels, in a manner resulting in the bag, when filled, assuming a substantially hexahedral shape and the gusset being substantially flat and forming a closed top for the bag;

handle web panels of thermoplastic material, one on each side of the bag, said panels having inner edge attachment portions contiguous the front and rear panels of the bag web adjacent the top gusset, and central ear handles extending from the attachment portions, said central ear handles being substantially identical in size and shape and including substantially circular hand-receiving openings;

said attachment portions extending the full width of the front and rear panels and including end edges contiguous the side seals;

connecting seals connecting the attachment portions to outer regions of the front and rear panels of the bag web adjacent the top gusset, said connecting seals also extending the full width of the front and rear panels; and

wherein in use the bag is filled through the fill opening and then the second end is sealed shut.

4,877,336

BOTTOM LOADED DUPLEX BAG HAVING A HANDLE AND METHOD OF MAKING SAME

Harry R. Peppiatt, Doylestown, Pa., assignor to Paramount Packaging Corporation, Chalfont, Pa.

Continuation of Ser. No. 3,110, Jan. 14, 1987, abandoned, which is a continuation-in-part of Ser. No. 821,561, Jan. 21, 1986, Pat. No. 4,713,839, which is a continuation-in-part of Ser. No. 388,381, Jun. 14, 1982, Pat. No. 4,573,203. This application Mar. 6, 1989, Ser. No. 320,845

Int. Cl.[4] B65C *30/00*

U.S. Cl. 383—8 **25 Claims**

1. A duplex bag, comprising:

top and bottom end portions;

an inner bag for storing product and an outer bag for supporting the inner bag, the inner and outer bags being respectively made of discrete inner and outer webs of thermal plastic material;

the outer bag including a front panel, a rear panel and handle portion connecting the panels together;

the inner bag including a front panel, a rear panel and a fold portion connecting the last-mentioned panels together;

said outer bag handle portion straddling said inner web fold portion at the top end portion of the duplex bag, the outer bag otherwise being open at the top end portion of the duplex bag;

said inner bag being open along the bottom end portion of the duplex bag to facilitate introduction of product into the inner bag.

4,877,337

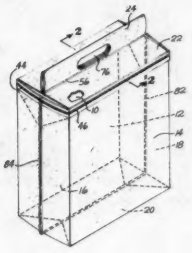
BAG WITH TOP COVER INCLUDING HANDLE

Jerry W. Wood, Kent, Wash., assignor to Cello Bag Company, Inc., Seattle, Wash.

Filed Feb. 13, 1989, Ser. No. 310,304

Int. Cl.[4] B65D *33/06*

U.S. Cl. 383—21 **3 Claims**



1. A top gusset, bottom-loaded bag comprising a unitary piece of flexible thermoplastic material including first and second rectangular panels and a rectangular gusset integral in one piece with said panels and extending between said panels at the top end of the bag, and said edge seals connecting said panels and said gusset together in a manner resulting in the bag approximating the shape of a hexahedron when filled and when closed at its bottom, and the improvement comprising:

a top cover of flexible thermoplastic material having first and second end portions and a central portion between said end portions that is longer than the gusset is wide when the bag is filled and the gusset is substantially flat;

said first end portion being connected to the first panel outwardly adjacent where said first panel meets the gusset;

said second end portion being connected to the second panel outwardly adjacent where the second panel meets the gusset;

said central portion of the cover being connected to itself along a line extending longitudinally of the gusset, to divide the cover into a lower base part which overlies said gusset and an upper handle part which is exposed above said base part; and

said handle part including a hand-receiving opening extending laterally through the handle part which is shaped to receive a person's hand.

4,877,338

GUIDE ARRANGEMENT IN A LINEAR POWER UNIT

Martin Aman, Skärholmen, Sweden, assignor to Linjär Transportteknik I Stockholm AB, Skärholmen, Sweden

Filed Jun. 1, 1988, Ser. No. 201,027

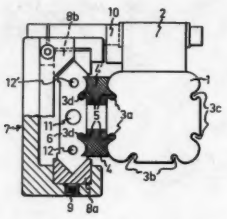
Claims priority, application Sweden, Jun. 3, 1987, 8702317

Int. Cl.[4] F16C *17/00*

U.S. Cl. 384—26 **12 Claims**

1. A power unit, comprising a cylinder housing, a piston disposed in said housing and linearly movable relative to said housing for producing push/pull forces in the direction of relative movement, a slide disposed externally of said housing and connected to said piston through a slot in said housing for movement with said piston relative to said housing, a linear guide rail fixedly connected to said housing and extending in said direction of relative movement, a guide device mounted on said guide rail and guided by said guide rail in said direction

of relative movement, and means coupling said slide to said guide device in such a manner as not to transmit force components directed laterally of said direction of relative movement, between said guide device and said slide.



4,877,339

BEARING SUPPORT OF A THROTTLE VALVE SHAFT IN THE HOUSING OF AN EXHAUST GAS LINE

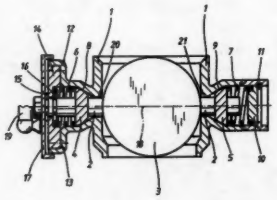
Hans-Dieter Schuster, Schorndorf; Christoph Noller, Winnenden; Gottfried Wollenraupt; Reiner Kreeb, both of Stuttgart, and Roland Huss, Esslingen, all of Fed. Rep. of Germany, assignors to Daimler-Benz AG, Stuttgart, Fed. Rep. of Germany

Filed Jan. 31, 1989, Ser. No. 304,123

Claims priority, application Fed. Rep. of Germany, Jan. 26, 1988, 3802243

Int. Cl.[4] F16C *17/02*

U.S. Cl. 384—218 **8 Claims**



1. A bearing support of a throttle valve shaft within the housing of an exhaust gas line, comprising bearing sleeve means of cup-shaped construction for rotatably supporting the shaft on both sides, the housing being constructed conically within the area of the bearing sleeve means, with the inner cross-sectional surface of the housing within the area of a bearing sleeve means and the outer cross-sectional surface of the latter tapering in the same direction, the bearing sleeve means being retained in the axial direction against the housing by way of their outer surfaces by at least one spring means acting in the direction of the shaft longitudinal axis, each bearing sleeve means being retained by itself against the housing by means of a spring means supported at the housing, and a separate axial bearing means securing the shaft against axial displacement.

4,877,340

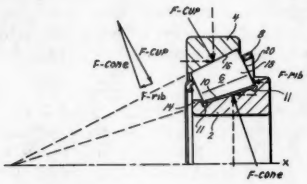
PROCESS FOR DERIVING THE CONTACT GEOMETRY FOR RACEWAYS AND ROLLERS OF A ROLLER BEARING

Michael R. Hoeprich, North Canton, Ohio, assignor to The Timken Company, Canton, Ohio

Filed Jun. 16, 1988, Ser. No. 207,542

Int. Cl.[4] F16C *33/36, 33/58, 43/04*

U.S. Cl. 384—571 **10 Claims**



1. In connection with a tapered roller bearing including at least one cone having an outwardly presented raceway, at least one cup having an inwardly presented raceway, and tapered rollers located between the cone and cup and having side faces which contact the cone and cup raceways, whereby for each roller a first contact exists between the cup raceway and the roller side face and a second contact exists between the cone raceway and the roller side face, a process for deriving the contact geometries for the raceways and roller side faces from a plurality of known load cycle repetitions, each load cycle repetition having a plurality of segments including load, external misalignment, and duration, said process comprising: arbitrarily selecting initial contact geometries for the raceways and roller side faces; for the selected contact geometries computing the internal misalignment between the cup raceway and the rollers and between the cone raceway and the rollers for each segment of the load cycle; using the internal misalignments, computing modifications to the selected contact geometries to provide altered contact geometries in which substantially uniform life theoretically exists along the first contact and also along the second contact; computing the internal bearing misalignments for the altered contact geometries for each segment of the load cycle; computing further modifications to the altered contact geometries to provide further altered contact geometries in which substantially uniform life theoretically exists along the first and second contacts at the recomputed internal misalignments; and reiterating the foregoing steps of computing internal misalignments and computing geometry modifications and altered contact geometries until substantial convergence is achieved, the resulting contact geometries having tapers which are off taper.

4,877,341

DEVICE FOR INTERMITTENT APPLICATION OF PARTICLES OF A POWDERED DEVELOPER TO THE RECORDING SURFACE OF A MAGNETOGRAPHIC PRINTER

Bernard Cherbuy, Belfont, and Jacques Estavoyer, Bavilliers, both of France, assignors to Bull S.A., Paris, France

Filed Jan. 27, 1989, Ser. No. 302,331

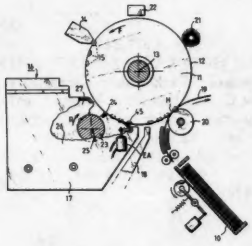
Claims priority, application France, Jan. 29, 1988, 88 01077

Int. Cl.[4] B41J *3/02*

U.S. Cl. 400—119 **27 Claims**

1. An applicator device for intermittent application of particles of a powdered developer to the recording surface (12) of a magnetographic printer, the surface being driven by displacement along a predetermined closed orbit that allows it to travel past a transfer station (H) where the developer that has been deposited on the surface is transferred to a printing substrate (19), means (17, 23, 24) for permanent application of 8 developer particles to said recording surface (12), means for recording latent images (14) on the recording surface in the course of

a plurality of successive displacement revolutions of the surface, and a particle eliminator device (45, 50, 51, 52, EA) disposed along said orbit, downstream of the application point (G) of particles on the recording surface by said applicator



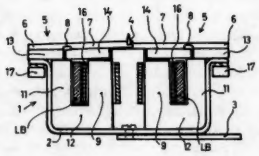
device, said particle eliminator device disposed between the application point (G) and said transfer station (H) being arranged to pull away particles of developer located on this surface except during the final one of said successive displacement revolutions of the surface.

4,877,342

METHOD OF MOVING PRINT ELEMENTS IN PRINTHEADS AND A PRINTHEAD WITH MOVING MECHANISM FOR PRINT ELEMENTS

Sven G. V. Stenudd, Lidingö , Sweden, assignor to Facit Aktiebolag, Sundbyberg, Sweden

Filed Mar. 9, 1988, Ser. No. 165,732
Claims priority, application Sweden, Mar. 27, 1987, 8701287
Int. Cl.[4] B41J *3/12, 9/38*
U.S. Cl. 400—121 **14 Claims**



1. A method of controlling a plurality of print elements of a printhead each arranged to execute a strinking motion comprising the steps of:

controlling a variable strength resultant magnetic field about each of a plurality of print element actuating means; and

controlling a magnetic field opposed to said variable strength resultant magnetic field about an individual one of said print element actuating means, whereby a corresponding individual one of said print elements executes said striking motion with a controlled forcefulness dependent on said variable strength resultant magnetic field.

4,877,343

SERIAL PRINTER HAVING MEANS FOR CONTROLLING PRINT HEAD IN RELATION TO CARRIAGE MOVEMENT

Masaaki Hori, Nagoya, Japan, assignor to Brother Kogyo Kabushiki Kaisha, Nagoya, Japan

Filed Oct. 19, 1987, Ser. No. 109,540
Claims priority, application Japan, Oct. 23, 1986, 61-252187
Int. Cl.[4] B41J *3/02*
U.S. Cl. 400—121 **11 Claims**

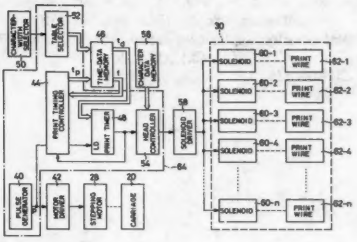
1. A serial printer comprising:

a print head;

a carriage supporting said print head and moved by a drive motor along a line of printing;

a pulse generator for generating pulse signals corresponding to incremental distances of movements of said carriage;

a time-data memory for storing time data representative of a time interval between a point of generation of each of said



pulse signals, and a point at which said print head effects a printing operation; and

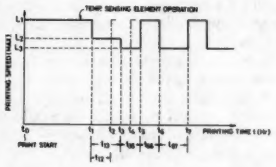
time-interval measuring means operable to measure said time interval according to said time data stored in said time-data memory, and generate a printing command to activate said print head for effecting said printing operation upon termination of measurement of said time interval.

4,877,344

IMPACT PRINTER TEMPERATURE CONTROL DEVICE

Shinichi Watahiki; Nobuhiko Itoh; Nobuo Ihata, and Masao Miyasaka, all of Ibaraki, Japan, assignors to Hitachi Koki Company, Limited, Tokyo, Japan

Filed Apr. 18, 1988, Ser. No. 182,679
Claims priority, application Japan, Apr. 17, 1987, 62-95794
Int. Cl.[4] B41J *3/12*
U.S. Cl. 400—124 **10 Claims**



1. In an impact printer in which a plurality of printing hammers operable by an electromagnetic unit are arranged linearly, and a printing operation is carried out at a first predetermined printing speed L_1 with a printing cycle and a sheet-feeding cycle conducted repeatedly, a control device comprising:

a temperature sensing means positioned to detect the temperature of said electromagnetic unit by one of direct detection and indirect detection, said temperature sensing means having a hysteresis characteristic such that said temperature sensing means produces a signal in response to a first predetermined temperature and is restored at a second predetermined temperature lower than said first predetermined temperature; and

a controller means for limiting said printing speed to a second printing speed L_2 lower than said first printing speed in response to said signal produced by said temperature sensing means in response to a first predetermined temperature and for returning said printing speed to said printing speed L_1 when said temperature sensing means is restored, and for limiting said printing speed to a third printing speed L_3 lower than said second printing speed L_2 when

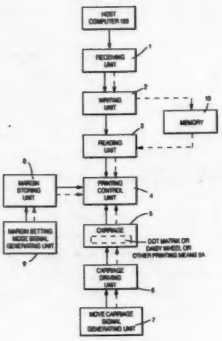
said temperature sensing means produces said signal for a duration greater than a first predetermined period of time.

4,877,345

MARGIN SETTING MEANS FOR A PRINTER

Hisanobu Hori, Fukuoka, Japan, assignor to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Continuation of Ser. No. 849,674, Apr. 9, 1986, abandoned. This application Apr. 20, 1988, Ser. No. 188,144
Claims priority, application Japan, Apr. 10, 1985, 60-75649
Int. Cl.[4] B41J *29/42*
U.S. Cl. 400—342 4 Claims



1. A printer for operating with a host computer and having a movable carriage, said printer comprising:

a receiving means for receiving control codes and printing character data from the host computer;

a memory means operatively connected to said receiving means for storing and subsequently reading out said control codes and printing character data received by said receiving means from the host computer;

a control means operatively connected to said memory means and to a carriage driving means for moving the carriage in accordance with said control codes and printing character data;

a margin position data storing means operatively connected to said control means for storing margin position data;

a move carriage signal generating means operatively connected to said control means for manually moving said carriage in response to manual inputs by an operator;

a margin setting signal generating means operatively connected to said margin position data storing means for providing margin setting signals to said margin position data storing means and for providing a margin setting mode signal to said control means via said margin position data storing means, said signals being provided in response to manual inputs by said operator;

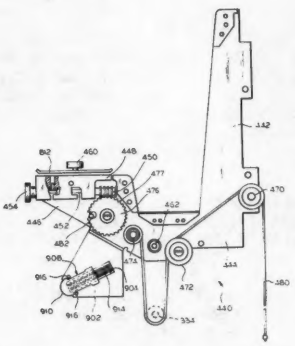
wherein said receiving means and memory means and control means and margin position data storing means and move carriage signal generating means and margin setting signal generating means recited above are arranged such that said operator first provides a manual input to said margin setting signal generating means to cause said receiving means and memory means and control means and margin position data storing means and move carriage signal generating means and margin setting signal generating means recited above to generate said margin setting mode signal so as to place the printer in a margin mode and said operator then manually moves said carriage to a desired margin position by providing a manual input to said move carriage signal generating means and then causes said margin position data storing means to store said carriage position as margin position data by providing a manual input to said margin setting signal generating means so as to cause said receiving means and memory means and control means and margin position data storing means and move carriage signal generating means and margin setting signal generating means recited above to generate margin setting signals to be fed to said margin position data storing means.

4,877,346

SHEET FEED HOPPER FOR INSERTION MACHINE

Kenneth L. Guenther, Park Ridge; Karavattuveettil G. Rabindran, Morton Grove; Thomas J. Faber, Skokie, and Jack S. Abrams, Arlington Heights, all of Ill., assignors to Bell & Howell Company, Chicago, Ill.

Filed Feb. 1, 1988, Ser. No. 151,200
Int. Cl.[4] B41J *13/10*
U.S. Cl. 400—624 5 Claims



1. A printer apparatus for printing pre-selected indicia on a document to be placed on a transport raceway of an insertion machine, including a lower frame means and an upper support frame means, said lower frame means carrying, but not limited to the following, namely, a base plate assembly, a controlled means, a power source means, pusher means, and pivot means on opposite sides of said lower frame means, said upper support frame means including complimentary means for cooperating with said pivot means to support said upper support frame means for pivotal movement relative to said base plate assembly, said upper transport frame means further including means for carrying a hopper, open on at least two sides, to hold a plurality of said documents in an easily accessible stacked arrangement, said upper support frame also carrying printing means for printing said documents, said printing means being modular and readily removeable from said upper support frame means, said controlled means actuated by said power source to repeatedly and individually deposit said documents one at a time from said hopper onto said base plate assembly, said resilient pusher means driven by said power source in timed relation to said controlled means for advancing each said document across said base plate assembly to a printing station beneath said printing means, flexible control means extending from said power source up to and connectable to said printing means for providing motive power for lateral movement thereof during the printing cycle carried out by said printing means, means for moving said document after printing from said printing station to said transport raceway, at least one extremity of said flexible control means connectable to said printing means is terminated in a large radius limited motion fixation device to thereby eliminate stress normally found in flexure about a limited point of fixation, said fixation device including an enlarged grooved sheave with said flexible control means passing over said sheave and having its termination fixed generally perpendicular to the normal position of said flexible control means, said fixation device further including

body means pivotally mounted and fixed relative to said sheave, said body means extending beyond the periphery of said sheave and carrying an enlarged termination means at the extremity of said flexible control means, and means for providing adjustable spring loaded pivotal control means for limiting rotary motion of said sheave and body means, said hopper and said upper support frame means being readily tipped about said pivot away from said base plate assembly whereby any jams or other impediments to proper operation of the device can be removed by an operator to permit continuation of proper operation thereof.

4,877,347

KEYBOARD FOR TYPEWRITERS OR SIMILAR MACHINES

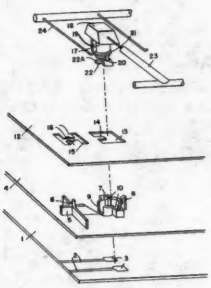
Johannes Haftmann, Schwabach, and Rudolf Schmeykal, Hemhofen, both of Fed. Rep. of Germany, assignors to Ta Triumph-Adler Aktiengesellschaft, Nuremberg, Fed. Rep. of Germany

Filed Nov. 25, 1987, Ser. No. 125,451

Claims priority, application Fed. Rep. of Germany, Jul. 9, 1987, 3722616

Int. Cl.[4] B41J *5/08*

U.S. Cl. 400—479 **7 Claims**



1. A keyboard for typewriters or similar machines having a key support, switching contacts and individual key push rods with keys, and a bed plate, with guides for the key push rods being provided in the key support, comprising:

spacers having a drop-in pin for engagement with the bed plate and provided on the key support;

resilient flaps cut-out of the bed plate which, when the bed plate is placed on the spacers, are locked to the drop-in pin of the key support;

means defining cut-outs cut in the bed plate and the key support for receiving, from above, corresponding key push rods;

a spring hook disposed on the guide which extends behind an edge on the key push rod when the key push rods are stopped in the correspondingly assigned guide and in this way limits movement of the key push rod against the direction of operation;

a resilient tongue formed out of the bed plate for activating the key push rods and extending behind a protrusion on the key push rod for maintaining the key push rod in a position in which the spring hook rests against the edge;

a contact bridge diecast on the key push rod; and

switching contacts closeable by the contact bridge when the key push rod is activated.

4,877,348

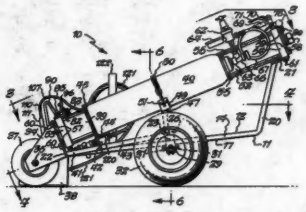
MANUALLY OPERATED PAINT STRIPER

David H. Opie, 614 Grandview Road, Fort Erie, Ontario, Canada (L2A 4V3)

Filed Sep. 14, 1988, Ser. No. 244,483

Int. Cl.[4] E01C *23/16*

U.S. Cl. 404—93 **14 Claims**



1. A striper for spraying a stripe of paint onto a surface without substantial bounce-back or overspary comprising a container containing high viscosity marking paint of the type conventionally used for striping, a nozzle, means for forcing said paint from said container through said nozzle by extrusion only at a pressure of between about 225 and 350 psi to produce a stripe of paint on a surface without producing substantial overspray, and means for moving said container across said surface to lay down said stripe at a velocity of between about 0.8 and 4.0 feet per second to thereby obviate bounce-back.

4,877,349

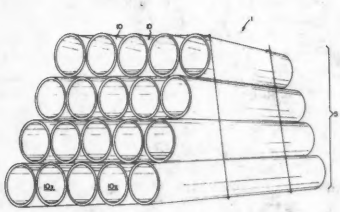
WAVE ABATEMENT DEVICE

Richard M. Greene, Southold, N.Y., assignor to Erosion Protection Devices, Incorporated, Southold, N.Y.

Filed May 27, 1988, Ser. No. 200,049

Int. Cl.[4] E02B *3/04*

U.S. Cl. 405—27 **12 Claims**



1. A wave abatement device for dissipating the energy of waves intended to strike a shorefront of a body of water, said device comprises:

at least three rows of elongated, hollow cylindrical tubes, said tubes in each row positioned in a side-by-side relation, each tube of said at least three rows of tubes being positioned in the same direction and with the centerline of each row basically perpendicular to the shorefront and basically parallel to the calm water surface of the body of water, said tubes of said at least three rows receive therethrough waves from the body of water, said at least three rows of tubes being buoyant in the body of water with said first row being positioned above the calm water line, said second row being positioned approximately at the calm water line, and said third row being positioned below the calm water line of the body of water and above the floor of the body of water; and

means for retaining said at least three rows of tubes in position with respect to each other,

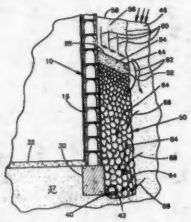
wherein waves exiting said device are calm as compared to the same waves as they entered said device.

4,877,350

FOUNDATION WATERPROOFING METHOD

Dante DiFiore, 5387 Wilson Mills Rd., Highland Hts., Ohio 44143

Filed Oct. 26, 1988, Ser. No. 262,731
Int. Cl.[4] E02B *11/00*
U.S. Cl. 405—38 4 Claims



1. A method of relieving and eliminating ground water buildup near at least a portion of a foundation of a building, wherein the building is of the type that has a footer drain tile system extending along the base of its foundation, and has a basement floor that is located at a level above the base of the foundation, the method including the steps of:

(a) digging a trench extending along and adjacent the exterior of an underground wall which forms at least a portion of a foundation of a building, with the trench being dug to a depth extending along the base of the foundation and to a depth that is below the level of the basement floor of the building;

(b) servicing such portions of the foundation wall as are exposed by the trench to diminish water permeability of the wall;

(c) servicing such portions of the footer drain tile system of the building as are exposed by the trench to assure that the portion of the foundation that is exposed by the trench is provided with footer drain tile means that extends along the base of the trench at a level below that of the basement floor for ducting water from the base of the trench to a suitable drain;

(d) filling lower portions of the trench with a bed of gradated stone to provide a porous reservoir that extends from the building foundation to the outer wall of the trench and that surrounds the footer drain tile means and extends upwardly therefrom along a major portion of the height of the foundation wall portion for receiving ground water and ducting it to the footer drain tile means to prevent the buildup of ground water in the vicinity of the foundation wall portion, with the gradated stones being installed in the trench in an ordered array with the largest of the stones being positioned in lowermost portions of the trench and about the footer drain tile means, and with progressively smaller stones filling progressively higher portions of the trench;

(e) providing a capping layer of densely compacted clay atop the bed of gradated stone, with at least the upper surface of the capping layer slanting downwardly as it extends across the width of the trench in directions away from the foundation wall, with the angle of inclination of the upper surface thereof being inclined from the horizontal within the range of about 20 to about 40 degrees; and

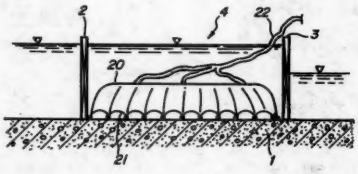
(f) filling remaining upper portions of the trench with topsoil, with the upper surface of the topsoil being inclined such that it slants downwardly as it extends across the width of the trench in directions away from the foundation wall.

4,877,351

APPARATUS FOR ADJUSTING A WATER LEVEL OF A LOCK

Yasushi Enami, Kodaira, Japan, assignor to Bridgestone Corporation, Tokyo, Japan

Filed Sep. 1, 1988, Ser. No. 239,360
Claims priority, application Japan, Sep. 9, 1987, 62-226065
Int. Cl.[4] E02C *5/00*
U.S. Cl. 405—86 7 Claims



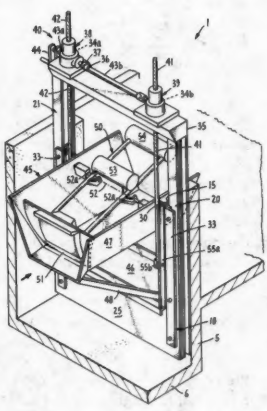
1. An apparatus for adjusting a water level of a lock, comprising: at least one collapsible fluid chamber arranged on a bottom of a lock room between lock gates in the lock, said fluid chamber comprising a parachute-like body made of a flexible sheet material fixed to the bottom of said lock room at peripheral edges thereof, means for supplying air into the fluid chamber to raise the water level in the lock room and wherein said fluid chamber is deflated by discharging air therein to lower the water level in the lock room.

4,877,352

METHOD AND APPARATUS FOR CONTROL OF AN UPSTREAM WATER LEVEL

Gary M. Tuttle, Tulare, and Steven DeShaw, Three Rivers, both of Calif., assignors to Waterman Industries, Inc., Exeter, Calif.

Filed Feb. 10, 1989, Ser. No. 309,471
Int. Cl.[4] E02B *7/28*
U.S. Cl. 405—104 15 Claims



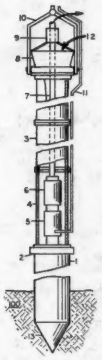
1. In an improved adjustable weir for the control of upstream water levels, allowing the flow of water at a level complementary to the upstream water level, the improvement comprising:

1. an open frame;

2. a trough assembly mounted within said open frame for vertical movement relative thereto, said assembly having a support plate with an upper portion forming a trough;

3. a sluice pivotally mounted to said plate for movement about an axis of rotation, said sluice comprising:
   a. a sector-shaped gate leaf to one side of said axis of rotation;
   b. two ballast containers, one of said ballast containers centered on said axis of rotation and the second of said ballast containers disposed on the opposite side of said axis from said gate; and
4. means for raising or lowering said trough assembly, said means comprising a tandem screw jack assembly fixedly mounted to said open frame wherein said trough assembly may be raised or lowered by means of said screw jack assembly.

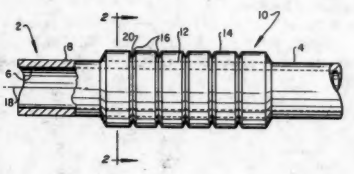
4,877,353
WASTE PILE
Serge Wisotsky, Sr., 89 Bullard St., Sharon, Mass. 02067-0422
Filed Jul. 14, 1986, Ser. No. 884,935
Int. Cl.[4] B09B *1/00*
U.S. Cl. 405—128 52 Claims



1. A geophysical repository method to more safely dispose of hazardous wastes in a hollow pile depository buried in a geologically stable subseabed under deep waters of minimum motion and life; immobilizing said hazardous materials within containers inside said pile; said pile interred into deka-millions years old sediments employing offshore piledriving techniques including repetitively applying impulsive, vibratory, and/or sustained driving forces from an extrinsic power source; buying said wastes inside said pile at a minimum depth of one hundred feet within the subseabed; precisely determined the location of said buried pile, for entry or future recovery of said containers, by surface and submarine navigation/positioning techniques.

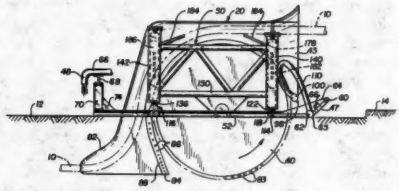
4,877,354
PIPELINE ANODE
George C. Williamson, Wylie, Tex., assignor to Atlantic Richfield Company, Los Angeles, Calif.
Filed Jul. 11, 1988, Ser. No. 217,255
Int. Cl.[4] F16L *1/04*
U.S. Cl. 405—157 12 Claims

1. Apparatus comprising an iron-containing tubular member having an interior surface and an exterior surface, said iron-containing tubular member having an anode positioned on said exterior surface, said anode having an interior surface contacting the exterior surface of the iron-containing tubular member and an exterior surface characterized by a plurality of generally circumferentially extending grooves longitudinally spaced apart on the exterior surface of said anode to direct crack



propagation in said anode in a generally circumferentially direction.

4,877,355
UNDERWATER CABLE LAYING SYSTEM
Norman Van Pelt, Cocoa Beach, Fla., assignor to Casper Colosimo & Son., Inc., Pittsburgh, Pa.
Filed Apr. 19, 1988, Ser. No. 183,075
Int. Cl.[4] F16L *1/04*
U.S. Cl. 405—159 40 Claims



1. An apparatus for embedding a cable-like member under water, comprising:
   a waterbed contacting support assembly having a front end,
   means mounted on said support assembly for receiving and guiding said cable-like member along said waterbed,
   a system of spray nozzle means located on said front end of said support assembly for creating spray flows at a sufficient flow rate and positive pressure of fluidize into a slurray at least the sand overburden of said waterbed in the path of said apparatus,
   eductor means supported by said waterbed contacting support assembly and said front end of said support assembly and extending longitudinally relative to and behind said apparatus, and including means for creating a negative pressure in said eductor means for picking up, carrying, and discharging said slurry in said path immediately behind said apparatus to embed said cable-like member,
   said eductor means further including intake means located in said front end of said support assembly in close proximity to said system of spray nozzle means, and being cooperatively operable with said system of spray nozzle means for directly removing said slurry from in front of said apparatus to substantially clear said path for relative ease of movement of said apparatus in said waterbed,
   fluid supply means for providing water under pressure and connected to said system of spray nozzle means and said eductor means for creating said positive and negative pressure therein.

4,877,356

METHOD AND APPARATUS FOR INSTALLING A FLOWLINE NEAR THE WATERBOTTOM

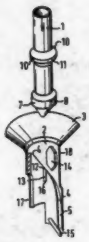
Pieter J. Bontenbal, Rijswijk, Netherlands, assignor to Shell Oil Company, Houston, Tex.

Continuation of Ser. No. 245,606, Sep. 19, 1988, abandoned. This application Apr. 17, 1989, Ser. No. 338,555

Claims priority, application United Kingdom, Sep. 30, 1987, 8722969

Int. Cl.[4] E21B *43/01*; F16L *1/04*

U.S. Cl. 405—169 9 Claims



1. A method for lowering a flowline through a body of water and subsequently hinging over the flowline to a substantially horizontal position near the waterbottom, the method comprising:

erecting a guide tube adjacent the waterbottom, said guide tube comprising a central opening defined downwardly therethrough, a pair of parallel slots formed within said central opening at the opposite side thereof, and passage means for allowing the flowline to hinge over about a horizontal pivot axis passing transversally through said slots;

stabbing a lower end of said flowline downwardly into the guide tube, and maneuvering pivots which are mounted at opposite sides of the flowline near the lower end thereof in slidable engagement with said slots;

deflecting the flowline near the lower end thereof in a predetermined lateral direction thereby inducing at least a lower portion of said flowline to hinge over to an inclined position in response to lowering of said pivots into said slots; and

landing said pivots on a pair of pivot supports mounted at the lower ends of said slots, allowing said lower portion of the flowline to further hinge over to a substantially horizontal position and laying the flowline away from the guide tube.

4,877,357

METHOD AND APPARATUS FOR MAKING A SLURRY TRENCH OR WALL IN THE SOIL

Alexander J. Verstraeten, Knokke-Heist, Belgium, assignor to Funderingstechnieken Verstraeten B.V., Oostburg, Netherlands

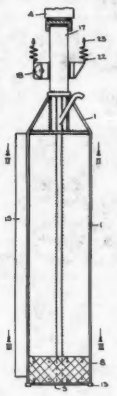
Filed Jan. 6, 1988, Ser. No. 141,322

Claims priority, application Netherlands, Dec. 10, 1987, 8702984

Int. Cl.[4] E02D *5/20*

U.S. Cl. 405—267 8 Claims

1. An apparatus for making a slurry trench or wall in the soil, substantially comprising a beam section provided at least at its bottom with a soil displacement portion, said beam being adapted to be driven into the soil by vibro-driving or pile driving, with simultaneous injection of a supporting fluid adjacent the soil displacement portion, and being subsequently extractable from the soil for forming a trench filled with supporting fluid, forming a slurry trench or wall after the supporting fluid has hardened, characterized in that said soil displacement portion (3,8) of the beam section (1) includes a box section substantially rectangular in cross-section and having side walls (8) provided with holes (10), said box section being provided at its bottom with a shut-off plate (3) whose edges project beyond the side walls (8) of the box section, said shut-



off plate (3) shutting off the interior of the box section during the driving of beam (1) into the ground and clearing this interior during its extraction from the soil, at least one feed tube (6) for supporting fluid (5) terminating in the interior of the box section.

4,877,358

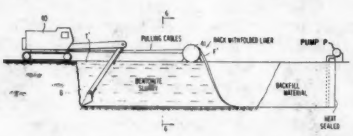
METHOD AND APPARATUS OF CONSTRUCTING A NOVEL UNDERGROUND IMPERVIOUS BARRIER

Arturo L. Ressi di Cervia, New York, N.Y., assignor to Finic, B.V., Rotterdam, Netherlands

Continuation of Ser. No. 252,676, Apr. 9, 1984, abandoned. This application Jan. 30, 1989, Ser. No. 303,046

Int. Cl.[4] E02D *29/00*

U.S. Cl. 405—267 5 Claims



1. An underground fluid material flow control barrier comprising,

(1) a narrow slot in the earth having a length extending across the expected flow path of said material, said slot having a depth extending at least to the water table,

(2) bentonite impregnating the earth walls of said slot and forming a bentonite cake on the inner surfaces thereof,

(3) a pair of flexible plastic sheets joined at their lower ends to form a sheath in said narrow slot and in contiguous relation to all surfaces in said slot,

(4) a coarse granular backfill material forming a liquid pervious filling in said sheath, said liquid pervious filling having a density greater than bentonite slurry used in forming said narrow slot and filling the entire space between said pair of flexible plastic sheets, and

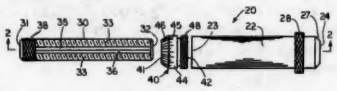
(5) means in said sheath for draining the liquid pervious filling, including pump means for draining said coarse granular backfill material.

4,877,359

ADJUSTABLE STOP MEMBER

Ivo Kolacek, 1004 S. Milwaukee, Wheeling, Ill. 60090

Filed Aug. 6, 1987, Ser. No. 82,329
Int. Cl.[4] B23B *49/00*; B23C *1/06*
U.S. Cl. 409—218 16 Claims



1. An adjustable stop member for use with machines having a tool support structure, a tool mounted on said tool support structure, a work holder, means for producing relative movement between the tool support structure and the work holder, such that the tool mounted on the tool holder can be brought into cutting contact with a work piece mounted on the work holder, and stop means for limiting the relative movement between the tool support structure and the

an elongate, cylindrical member having first and second ends and an elongate bore which is coaxial with a longitudinal axis of said cylindrical member, said elongate bore extending inwardly from the first end of said cylindrical member;

internal threads along the length of said elongate bore;

an elongate rod having first and second ends;

a threaded section formed along the longitudinal length of said elongate rod, said threaded section comprising external threads which extend from the first end of said elongate rod along at least the major portion of the length of said elongate rod, with the threaded section of said elongate rod being receivable within said elongate bore in said cylindrical member for making engagement with the internal threads of said elongate bore such that the threaded section of said elongate rod can be adjustably advanced into and withdrawn from the elongate bore in said cylindrical member to thereby adjustably vary the effective, combined, longitudinal length of the cylindrical member and the elongate rod threaded therein;

an elongate, relatively narrow, linear flat formed along the length of the threaded section in said elongate rod, said flat being formed at least as deeply into the surface of the elongate rod as are the deepest portions of the threads;

an index line on said flat, said index line extending along the length of said flat and being parallel to the longitudinal axis of said elongate rod;

a nut having first and second ends is threaded on the threaded section of said elongate rod such that the first end of said nut faces the first end of said elongate rod when the nut is fully threaded on the threaded section of said elongate rod;

a circumferential band adjacent to the first end of said nut, said band being polished; and

equally spaced markings along the circumferential length of the polished band on said nut, said markings forming a scale which extends around the length of said band,

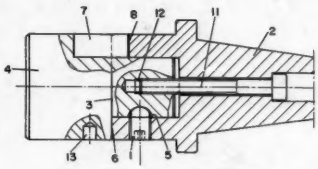
whereby, when the threaded section of the elongate rod is threaded into the first end of said cylindrical member, the scale on the nut and the index line on said flat of said elongate rod can be used to accurately adjust the overall length of the cylindrical member and elongate rod, and the nut can further be tightened against the first end of said cylindrical member to firmly secure the elongate rod and the cylindrical member in a releasably, fixed position relative to each other, and the stop member, comprising the elongate rod and the cylindrical member, can then be positioned in the stop means of said machine to limit the distance within which the tool support structure and the work holder can approach each other during use of said machine.

4,877,360

APPARATUS FOR LOCKING AND/OR GRIPPING MODULAR ATTACHMENTS OF BORING HEADS, BORING BARS, INTERMEDIATE MEMBERS, ADAPTERS, TOOL HOLDERS, HYDRAULIC PUNCHES, LONG TONGS, OR OTHER MECHANICAL MEMBERS

Emile Pfalzgraf, 7, rue de Neuwiller, 67330 Bouxwiller, France

Filed May 7, 1985, Ser. No. 731,586
Int. Cl.[4] B23C *5/26*; B23B *31/00*
U.S. Cl. 409—234 5 Claims



1. In an apparatus for locking and/or gripping modular mechanical members, of the type comprising a rotatable driving member having a central bore extending in the direction of its axis of rotation and a driven member having a tool and a central projection adapted to be received by said bore, said driving and driven members adapted to be interfittable along the axis of the rotation of said driving member such that said driven member is driven in rotation by rotating said driving member; the improvement comprising: at least one fastening element comprising a radially inwardly extending screw having a hemispherical head, said screw being disposed in said driving member, and a hemispherical recess disposed on said central projection of said driven member; said screw and said recess being so dimensioned and disposed that when said driving and driven members are interfitted said hemispherical head of said screw is insertable in said hemispherical recess; said hemispherical recess having a radius greater than the radius of said hemispherical head, to provide relative rotation of said interfitted driving and driven members for urging said hemispherical head against said hemispherical recess, whereby said driven member is urged into tight frictional engagement with said driving member upon rotation of said driving member.

4,877,361

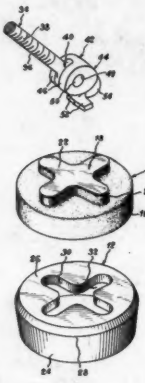
ELASTOMERIC INSERT FOR CONTAINING LASHING

Angelo DeRosa, and Kevin D. McKenna, both of Holmdel, N.J., assignors to Sterling Plastic & Rubber Products, Inc., South Amboy, N.J.

Filed Dec. 16, 1986, Ser. No. 942,274
Int. Cl.[4] B60P *7/13*; B61D *45/00*
U.S. Cl. 410—112 5 Claims

1. In a steel container ship, an insert for filling a cavity of a socket installed flush with a deck's surface of said ship for securing a container by lashing equipment to the deck, said socket including a top plate rigidly secured to said socket and to said deck with an upper surface of said plate being flush with said deck, said plate having an opening for permitting a lashing knuckle of the lashing equipment to be inserted through said plate opening into the filled cavity of said socket for engagement with an underside portion of said top plate so as to secure said container to said deck socket and for permitting the lashing knuckle to be withdrawn therefrom for releasing the container, said insert comprising an elastomeric element consisting of a base conforming to the cavity of said socket and filling said cavity, a top of said element conforming to said plate opening so as to fill said plate opening flush with said upper plate surface, and adhesive means for securing said top of said elastomeric element to said base of said elastomeric element, said elastomeric element being of such resilient consistency whereupon insertion of the lashing knuckle through the plate open-

ing depresses that portion of the top elastomeric element engaged by the lashing knuckle while part of the remaining portion of the top elastomeric element remains substantially



undepressed within the plate opening and substantially flush with the top surface of said plate, thus preventing debris from entering the cavity during securement of the container by the lashing equipment.

4,877,362

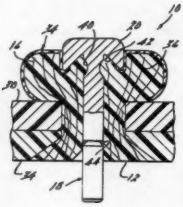
SHEATHED COMPOSITE BLIND RIVET

Imre Berecz, El Toro; Dennis Schultz, Chino, and Dennis L. Hinton, Yorba Linda, all of Calif., assignors to Microdot Inc., Darien, Conn.

Continuation of Ser. No. 727,779, Apr. 26, 1985, Pat. No. 4,478,544. This application Jul. 18, 1986, Ser. No. 886,672

Int. Cl.[4] F16B *13/04*

U.S. Cl. 411—34 **1 Claim**



1. A blind plastic rivet for acceptance in an aperture in a workpiece, said rivet comprising:

a tubular body portion,

a head forming portion,

a mandrel extending centrally of the body portion of said rivet and having a stem portion at one end an anvil at the other end overlying the head forming portion of said rivet, said mandrel being movable axially relative to the body and head forming portions of said rivet to form a radially expanded blind head on the head forming portion of said rivet, said body and head forming portions comprising a plurality of substantially continuous carbon fibres encapsulated in a resin matrix, the head forming portion of said rivet being radially deformable upon heating thereof, and

a tubular, ductile, elastically expandable plastic sheath separate from said body portion but fully covering the blind head on said rivet, said sheath having one end portion initially engaged with said workpiece and movable to a position partially underlying the head forming portion of said rivet at the radially outer extremity thereof after deformation of said head forming portion, an opposite end portion of said sheath being initially disposed in close proximate relation to and about the stem portion of said mandrel and movable to a position partially underlying the anvil on said mandrel at the radially outer extremity thereof so as to be mechanically retained by said anvil, the head on said rivet having radially inner portions in direct engagement with both the anvil on said mandrel and the workpiece.

4,877,363

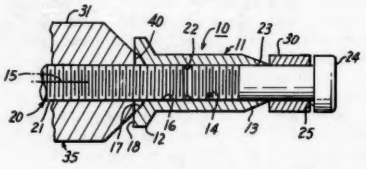
BLIND FASTENER

Herman L. Williamson, Seal Beach, and Michael M. Schuster, Santa Monica, both of Calif., assignors to Hi-Shear Corporation, Torrance, Calif.

Filed Feb. 10, 1987, Ser. No. 13,011

Int. Cl.[4] F16B *13/04*

U.S. Cl. 411—43 **4 Claims**



1. In a blind fastener of the type having an axially extending sleeve with an axially extending internally threaded passage therethrough, a head at one end having an axially facing surface thereon with off-axis recesses therein, and an external taper on the other end; a mandrel including an extended threaded shank threaded into and through said passage, a head on said mandrel with a bearing surface facing said tapered end, and torque tool engaging means on the opposite side of the said sleeve from said head; a tubular collar on said mandrel between said tapered end and said head; and a nut threaded to said mandrel with a bearing face facing toward said surface of the head of said sleeve, the improvement comprising:

said bearing face of said nut being adapted to deform so as at least partially to enter and engage in said recesses in the head of said sleeve; and said bearing face being scalloped to form relieved and projecting portions, the latter to make said entry, deforming while doing so.

4,877,364

CAPTIVE SCREW AND ASSEMBLY

Gregory Sorrentino, Brewster, N.Y., assignor to General Data-Comm. Inc., Middlebury, Conn.

Continuation of Ser. No. 758,194, Jul. 24, 1985, abandoned. This application May 26, 1987, Ser. No. 54,299

Int. Cl.[4] F16B *21/00, 35/04*

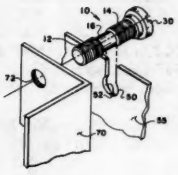
U.S. Cl. 411—337 **13 Claims**

1. A threaded fastener assembly, adaptable to detachably fasten a panel member to a support member of the assembly in a first mode of operation, which assembly includes a male threaded fastener screw member that may be loosely held in captive relation to said support member in a second mode of operation, which screw member is adaptable to be readily detached by manual effort from said support member and which screw member is adaptable to be readily subsequently reengaged by manual effort to said support member, comprising:

a support member having a female threaded hole; and

a male threaded screw member having a head and a shank, said shank shaped with an unthreaded mid-section of the

shank that separates to spaced-apart male threaded portions of the same pitch and thread size, said unthreaded mid-section of said screw member shank having a diameter smaller than the root diameter of the said threaded sections, said head and the threaded head-end portion of the shank adjacent said head being heavier than the other tail-end threaded portion of said shank so that when said unthreaded mid-section of said screw fastener is loosely held in unthreaded engagement in the female threaded hole of said support member, said male threaded screw member tilts relative to the axis said male threaded screw member assumes when it is in threaded engagement with said female threaded hole such that said male threaded screw member is captive to said support member and such that accidental threaded engagement of either said tail-end or said head-end threaded portion with said female threaded hole is eliminated, wherein,



said female threaded hole is of a thread size to readily mate in threaded engagement with either of the threaded portions of said screw member so that the screw member may be readiiy engaged into or removed from engagement with said female threaded hole, with

said screw member adaptable to be retained in a captive mode to said support member, with its unthreaded midsection held loosely in said female threaded hole of said support member without stressing the threaded portions of said threaded fastener assembly during said captive mode and during positioning of said screw member into or out of said captive mode, and with

said screw member adaptable to detachably bolt a panel member to said support member in threaded engagement of the head-end threaded portion of the screw member to the said female threaded hole, and in which

said screw member is readily manually detachable from captive engagement to said female threaded support member.

4,877,365

SIDE SHIFT GRAPPLER

John J. Lanigan Jr., Lynwood; Myron Glickman, Morton Grove, and Bernard A. Ermel, Clarendon Hills, all of Ill., assignors to Mi-Jack Products Inc., Northbrook, Ill.

Filed Oct. 20, 1986, Ser. No. 920,792

Int. Cl.[4] B60P *1/64*

U.S. Cl. 414—459 **8 Claims**

1. A crane and lift apparatus including

frame means having a pair of lower beams supporting four corner beams in turn supporting a pair of vertically movable upper stabilizing beams forming generally parallel track means transverse to said lower beams,

wheel means rotatably supported beneath said frame means, drive means operatively coupled to said wheel means for causing movement of said frame means,

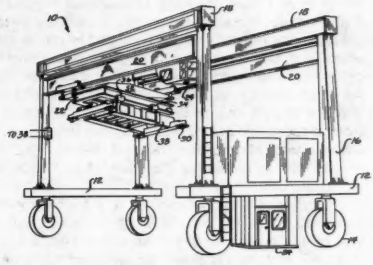
upper frame assembly means movably mounted on said stabilizing beams for transverse movement therealong,

lower frame assembly means movably to an underside portion of said upper frame assembly adaptable for longitudinal horizontal movement therealong and having longitudinally, slidable container attachment mean thereon

power drive means operatively coupled to said drive means, said upper frame assembly and said lower frame assembly means, said power drive means acting selectively to operate said drive means to cause movement of said frame means, to move said upper frame assembly along said upper stabilizing beams, and to move said lower frame assembly means longitudinally along said upper frame assembly means for attaching to, carrying, positioning and releasing a container,

operator control means connected to said power drive means for independently controlling the operations of said drive means, said upper frame assembly means and said lower assembly means,

comprising side shift grappler means mounted within said upper frame assembly means for preselected incremental



rectilinear movement therein as directed at times by said operator control means, said side shift grappler means comprising

first end means fixedly mounted on said upper frame assembly means,

second end means movably mounted on said upper frame assembly means for reciprocable movement therein, and

retractable cylinder means connected between said first end means and said second end means for at times being effective to move said second end means toward and away from said first end means thereby to cause said lower frame assembly means when attached to said container to move a preselected incremental horizontal distance.

4,877,366

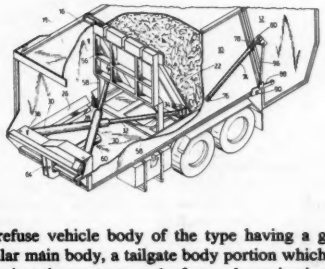
REFUSE VEHICLE

Quinto De Filippi, 29 Edenvalley Drive, Islington, Ontario, Canada

Filed Apr. 22, 1988, Ser. No. 184,668

Int. Cl.[4] B65F *3/28*

U.S. Cl. 414—517 **5 Claims**



1. A refuse vehicle body of the type having a generally rectangular main body, a tailgate body portion which may be raised to eject the contents, and a forward opening in the main body through which refuse may be dumped, and a ram member moveable through said main body, from said forward opening to said tailgate, for compacting refuse, and for subse-

quently ejecting refuse from said main body and being characterized by;

a moveable bridge member of hollow multi-wall construction extending from side to side of said main body;

slide means in said main body for cooperation with said bridge member, for permitting sliding movement of said bridge member along said main body between a forward compacting position and a rearward ejecting position;

left and right hand compacting cylinders connecting diagonally across said main body, with respective left and right hand corners of said ram member, and said right and left hand cylinders being pivotally mounted to said bridge member and to said ram member, whereby said cylinders being operable to move said ram member relative to said bridge member along said main body for compacting refuse in said main body and said tailgate portion;

cylinder storage recess means formed in said bridge member for receiving portions of said right and left hand cylinders when said ram member is in its retracted position, said cylinder storage recess means including a lower wall, side walls, an intermediate wall, and a top wall, and wherein said lower wall and said intermediate wall define a first storage recess for one of said right and left cylinders, and wherein said intermediate wall and said top wall define a second storage recess for the other of said right and left cylinders; and,

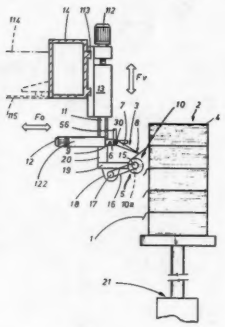
ejection cylinder means connected to a forward portion of said main body, and to said bridge member, for moving said bridge member away from said forward portion of said main body towards said tailgate portion, for ejecting contents from said main body.

4,877,367

APPARATUS FOR THE AUTOMATIC SEPARATION INTO REAMS OF A STACK OF LARGE FORMAT SHEETS OF PAPER THE REAM DIVISIONS OF WHICH ARE COUNTED OFF PREVIOUSLY AND INDICATED BY MARKERS

Andrea Cinotti, Bologna, Italy, assignor to Wrapmatic S.p.A., Bologna, Italy

Filed Nov. 16, 1987, Ser. No. 120,827
Claims priority, application Italy, Dec. 16, 1986, 3609 A/86
Int. Cl.[4] B65H *3/50*
U.S. Cl. 414—796 5 Claims



1. An apparatus for the automatic separation into reams of a large format sheet stack of paper the ream divisions of which are counted off previously and indicated by markers inserted into said sheets so that a portion of said marker is outside of a side of said sheet stack comprising:

gripping means able to grip each marker and simply tension it at an angle in relation to the sheet stack;

a non-suction separator mechanism vertically disposed with respect to the gripping means, said separator consisting in a follower, exhibiting a tapered projecting end that is designed to enter into contact with each marker and thereafter to penetrate easily into the sheet stack hinged to a support horizontally movable once the marker is gripped and taut, among a retracted position in which the follower is distanced from the marker, through intermediate positions in which the follower touches and follows the gripped marker along its bare portion, and at least one extended position in which the follower penetrates into the sheet stack causing a lifting of the separating uppermost sheet stack ream;

pushing means able to horizontally distance the separated ream from the stack and operate through the direction of said separator mechanism; and

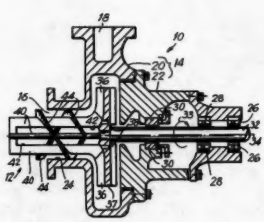
said gripping means being located on a level below that of the separator mechanism, and the follower of the separator mechanism pivots freely about the support to follow the gripped marker by gravity.

4,877,368

FLUIDIZING CENTRIFUGAL PUMP

Jukka Timperi; Reijo Vesala, both of Kotka, and Vesa Vikman, Kymi, all of Finland, assignors to Ahlstrom Corporation, Finland

Filed Nov. 8, 1988, Ser. No. 268,599
Int. Cl.[4] F04D *13/12*
U.S. Cl. 415—143 18 Claims



1. A fluidizing pump for medium to high consistency fiber suspension, comprising:

a housing having an axis, an axially-extending inlet channel through which fiber suspension is received and an outlet through which fiber suspension is discharged;

an impeller operatively rotatable in said housing and comprising a working vane and a fluidizing blade extending substantially axially along and in said inlet channel; and

a feeder vane extending in and along said inlet channel and oriented at an angle of between approximately 1 and 89 degrees to said housing axis, said feeder vane being disposed radially outward of said fluidizing blade and extending along at least a portion of said substantially axial extension of the fluidizing blade.

4,877,369

VANED DIFFUSER CONTROL

Phiroze Bandukwalla, Olean, N.Y., assignor to Dresser-Rand Company, Corning, N.Y.

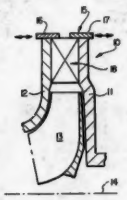
Filed Feb. 8, 1988, Ser. No. 153,589
Int. Cl.[4] F01D *17/14*
U.S. Cl. 415—148 9 Claims

1. In a compressor diffuser having an inlet, an annular outlet, a passageway between said inlet and said annular outlet for the flow of compressed fluid therethrough, and a plurality of vanes formed in said passageway,

the improvement comprising

an annular restriction downstream of, adjacent to and cooperating with the annular outlet,

wherein the restriction defines an annular exit opening for compressed fluid exiting said diffuser, the width of which



annular opening can be varied by movement of said restriction transverse to said annular opening.

4,877,370

DIFFUSER FOR CENTRIFUGAL COMPRESSOR

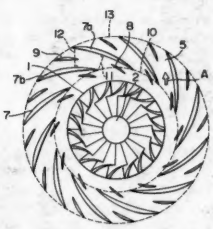
Koji Nakagawa, Tsuchiura; Takeo Takagi, Tsukuba; Yoshiaki Abe, and Haruki Sakai, both of Ibaraki, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Aug. 30, 1988, Ser. No. 238,176

Claims priority, application Japan, Sep. 1, 1987, 62-218941; Sep. 28, 1987, 62-240737

Int. Cl.[4] F04D *29/30*

U.S. Cl. 415—148 **12 Claims**



1. A diffuser of a centrifugal compressor including a plurality of stator blades disposed on an outside of an impeller thereof, and which converts kinetic energy of fluid discharged from said impeller into pressure energy by operation of said stator blades, said diffuser comprising sub-blades having a cord length shorter a cord length of said stator blades disposed near inner ends of and between said plurality of stator blades, one side surface of each of said sub-blades confronting said stator blade, the other side surface of each of said sub-blades not confronting a neighboring stator blade, said sub-blades being situated at positions intersecting a circle having a center thereof at a center of a rotational shaft of said impeller and which passes through the inner end of said stator blade.

4,877,371

PUMP

Francis G. Putt, Brighton, Mich., assignor to Kerr Machinery Corporation, Oak Park, Mich.

Filed Aug. 22, 1988, Ser. No. 234,588

Int. Cl.[4] F04D *29/62*

U.S. Cl. 415—169.1 **1 Claim**

1. A vertical turbine pump for transferring liquid from a tank having a top panel with an aperture therein, said pump comprising

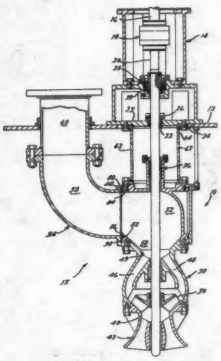
a motor bracket secured to the top panel of said tank;

a rotatable pump shaft extending downwardly through said motor bracket and through the aperture in the top panel of said tank;

an impeller on said pump shaft;

an impeller bowl surrounding said impeller and having a discharge throat of relatively smaller diameter than said impeller and a truncated conical upwardly divergent fluid pressure reducing chamber above the discharge throat thereof;

a fluid flow diverter having a first 90° elbow portion communicating with the pressure reducing chamber of said impeller bowl for directing fluid flow at a right angle to the axis of rotation of said pump shaft, the first 90° elbow portion of said diverter having circular upper and lower flanges removably and sealably acceptable in complementary circular apertures in said diverter, a second 90° elbow portion of said diverter communicating with the first elbow portion for directing fluid flow to a path parallel to the axis of rotation of said pump shaft;



a shaft seal in the first 90° elbow of said flow diverter on an opposite wall thereof from the pressure reducing section of said impeller bowl, said shaft and one side of said shaft seal being exposed to fluid pressure internally of said flow diverter and the other side of said shaft seal being in fluid flow communication with the inside of said tank and exposed to internal tank pressure; and

a vapor seal in the cover plate of said tank and disposed about said shaft, said vapor seal being disposed in axially spaced relation to said shaft seal, whereby said shaft between said shaft and said vapor seal is exposed to internal tank pressure and fluid leakage past said shaft seal is vented back to tank; said motor bracket, pump shaft, vapor seal, shaft seal, first diverter section, suction bowl, impeller bowl and impeller being vertically removable as an assembly through the aperture in the top panel of said tank.

4,877,372

MULTI-STAGE ROTARY PUMP

Niels D. Jensen, and Erik Svarre, both of Bjerringbro, Denmark, assignors to Grundfos International A/S, Bjerringbro, Denmark

Filed Sep. 2, 1988, Ser. No. 240,085

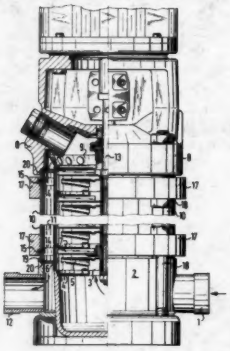
Claims priority, application Fed. Rep. of Germany, Sep. 4, 1987, 3729673

Int. Cl.[4] F04D *29/62*

U.S. Cl. 415—199.1 **2 Claims**

1. A multistage rotary pump comprising a substantially closed elongated pump body which is provided at one of its extremities with a base element containing suction and pressure connecting pieces and at its other extremity with a top element and which is surrounded in spaced relationship by a jacket to

form an annular return volume, and clamping means joining the jacket to the base element and the top element, the jacket being sealed with respect to these elements and being provided at least substantially close to its two extremities with contact shoulders which are acted upon by the clamping means,



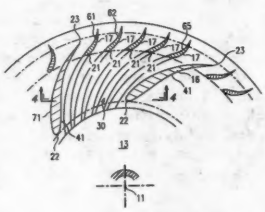
wherein the terminal portions of the jacket are each provided with a pressed-in peripheral groove, each of the two grooves having inserted into it an annular element projecting radially outwards with respect to the jacket and forming the said contact shoulder, and an axially stressed clamping ring acts on the said annular element.

4,877,373

VANED DIFFUSER WITH SMALL STRAIGHTENING VANES

Phiroze Bandukwalla, Olean, N.Y., assignor to Dresser-Rand Company, Corning, N.Y.

Filed Feb. 8, 1988, Ser. No. 153,591
Int. Cl.[4] F04D *29/44*
U.S. Cl. 415—208.4 **17 Claims**



1. In a diffuser having a first row of primary curved vanes, each of said primary curved vanes having a leading edge and a trailing edge, the improvement comprising:

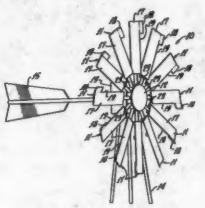
a second row of secondary curved vanes which are smaller than said primary curved vanes, said second row being located radially outwardly from the leading edges of the first row of primary curved vanes, each of the secondary curved vanes having a leading edge located radially inwardly of the trailing edges of the primary curved vanes, each pair of adjacent primary curved vanes having a respective plurality of said secondary curves vanes positioned between the primary curved vanes of the respective pair, the camber of the secondary curved vanes opposing the camber of the primary curved vanes.

4,877,374

SELF-REGULATING WINDMILL

Bill Burkett, 4319 Los Serranos Blvd., Chino, Calif. 91709

Continuation-in-part of Ser. No. 186,380, Apr. 26, 1988, abandoned. This application Jan. 23, 1989, Ser. No. 299,886
Int. Cl.[4] F03D *7/04*
U.S. Cl. 416—136 **10 Claims**



1. A windmill comprising

a hub,

means for mounting said hub for rotation about a generally horizontal axis,

a plurality of blades,

means for connecting said blades to said hub such that said blades project radially from said hub and are adapted to receive wind traveling in a direction toward said blades and generally parallel to said axis,

said means for connecting said blades to said hub including means for permitting pivotal movement of said blades about a longitudinal axis for varying the angle of each of said blades relative to said direction between a first position in which said blades are at a relatively large angle relative to said direction and a second position in which said blades are at a relatively shallow angle relative to said direction,

and resilient means biasing said blades to said first position,

each of said blades including an elongated principal portion having a leading edge, and a relatively small tab means projecting from said leading edge and spaced from said longitudinal axis, said tab means being shorter than said elongated principal portion and located substantially at the outer end thereof,

said tab means being at a more shallow angle relative to said direction than is said principal portion when said blade is in said first position thereof, whereby when said blade is rotated the resistance of the air to the rotation of said tab means generates a force on said tab means so that said tab means causes said blade to pivot from said first position to said second position thereof in opposition to said resilient means when said blade is subjected to relatively high rotational velocities.

4,877,375

DRIVE SHAFT AND ROTOR HUB FOR HELICOPTER FLEXIBLE ROTOR SYSTEM

Rene A. Desjardins, Media, Pa., assignor to The Boeing Company, Seattle, Wash.

Filed Sep. 30, 1986, Ser. No. 913,274
Int. Cl.[4] B64C *27/33*
U.S. Cl. 416—134 A **14 Claims**

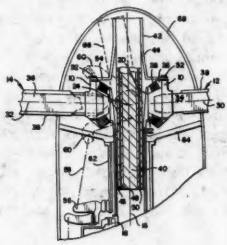
1. A rotor for supporting helicopter rotor blades that extend radially outward from the rotor comprising:

a rotor shaft driveably connecting the rotor to a power source, mounted for rotation about a central longitudinal axis;

a rotor hub surrounding the axis of the rotor shaft and adapted for attachment to the rotor blades;

bearing means located between the rotor hub and the rotor shaft, defining a center about which the rotor hub is supported on the rotor shaft; and

flexible shaft means coaxial with, connected to and forming an extension of the rotor shaft, said flexible shaft means also being connected to the rotor hub for flexibly connecting the rotor shaft to the rotor hub for pivotal movement about said center and for inflexibly connecting the rotor



shaft to the rotor hub for torsional movement, wherein the load path by which rotor torque is transmitted between the rotor shaft and the rotor hub through the bearing means is flexible in relation to the load path by which rotor torque is transmitted between the rotor shaft and rotor hub through the flexible shaft means.

4,877,376

ATTACHMENT OF A ROTOR BLADE OF FIBER REINFORCED PLASTIC TO A METAL ROTOR HUB

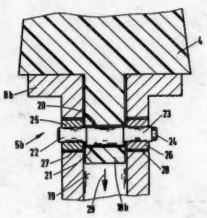
Siegfried Sikorski, Munich, and Werner Hüther, Karlsfeld, both of Fed. Rep. of Germany, assignors to Motoren-und Turbinen-Union Munchen GmbH, Munich, Fed. Rep. of Germany

Filed Jun. 3, 1988, Ser. No. 202,710

Claims priority, application Fed. Rep. of Germany, Jun. 4, 1987, 3718678

Int. Cl.[4] B64C *11/04*

U.S. Cl. 416—207 **15 Claims**



1. Apparatus for attaching a rotor blade of a turbine to a rotor hub of the turbine, said apparatus comprising a shank extending axially on a rotor blade of a turbine, a tubular, metal body constituting part of a hub of the turbine, said metal body having a bore receiving said shank, and tensioning means connecting said shank and said tubular body for applying tensile force to said shank, said shank being integrally formed with the blade of a fiber reinforced synthetic resin material, said tensioning means comprising a tension bolt received in a transverse opening provided in said shank, means on said tension bolt projecting laterally of said shank, and turnable means accesible from outside said metal body and engaging said metal body and said means which projects laterally of said shank for applying adjustable tensile force to said shank via said tension bolt by turning said turnable means from outside said metal body.

4,877,377

ROTARY PUMP SYSTEM

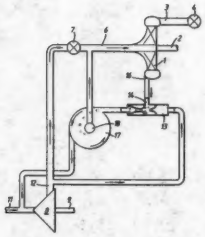
Peter J. Taylor, Hants, England, assignor to Plessey Overseas Limited, Ilford, England

Filed Jun. 24, 1988, Ser. No. 211,286

Claims priority, application United Kingdom, Jun. 25, 1987, 8714986

Int. Cl.[4] F04B *23/14*

U.S. Cl. 417—89 **5 Claims**



1. A rotary pump system for pumping a liquid which is delivered under pressure from a backing pump, in which the rotary pump has a pump body which is required to be drained of liquid at times when the rotary pump is inoperative, wherein the backing pump has a by-pass circuit between its inlet and outlet ports, the by-pass circuit comprising a multiphase pump which has a suction inlet connected to a drain point on the rotary pump body and a vortex chamber through which liquid passes from the multiphase pump outlet to the backing pump inlet, a central outlet of said vortex chamber being connected to an inlet port of said rotary pump.

4,877,378

VIBRATORY DIAPHRAGM PUMPS

Michael J. Saggers, 9 Pennycroft, Harpenden, Hertfordshire, AL52PD, England

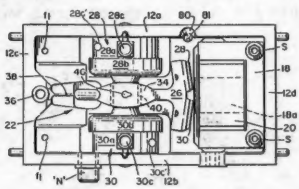
PCT No. PCT/GB86/00759, § 371 Date Aug. 10, 1987, § 102(e) Date Aug. 10, 1987, PCT Pub. No. WO87/03650, PCT Pub. Date Jun. 18, 1987

PCT Filed Dec. 11, 1986, Ser. No. 95,171

Claims priority, application United Kingdom, Dec. 11, 1985, 8530514; Dec. 12, 1985, 8530666; Dec. 12, 1985, 8530667

Int. Cl.[4] F04B *45/04, 35/04*

U.S. Cl. 417—299 **10 Claims**



1. A pneumatic vibratory diaphragm pump, characterised by a casing comprising an upper chamber having an inlet by which air can be drawn from outside the casing and a lower chamber having an outlet from which air can issue from the casing, an oscillatory armature within the lower chamber to actuate a diaphragm of at least one diaphragm and valve assembly and drive means to cause oscillatory movement of the armature, each diaphragm and valve assembly being operatively connected with the upper chamber so as to induce air to be pumped thereby from the upper chamber and to discharge air into the lower chamber whereby the lower chamber pro-

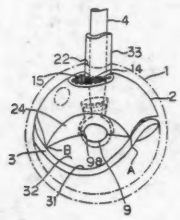
vides an expansion chamber for the pump and from which the discharged air issues from said outlet.

4,877,379

ROTARY MECHANISM FOR THREE-DIMENSIONAL VOLUMETRIC CHANGE

Kunio Okabe, 8-31, Kyomei 1-chome, Chikusa-ku, Nagoya, Aichi, Japan

Filed Jun. 25, 1987, Ser. No. 66,243
Claims priority, application Japan, Jun. 25, 1986, 61-147083
Int. Cl.[4] F01C *3/00, 17/02, 19/08*
U.S. Cl. 418—51 **93 Claims**



1. A rotary mechanism for a three-dimensional volumetric change, comprising:

a casing having an at least partly spherical inner space;

a rotor disposed in the casing and having a partially spherical surface associated with a spherical wall of said inner space as a bottom surface and a substantially conical surface which includes a plurality of apexes extending substantially radially;

a member having a curved surface constituted by a spherical peritrochoidal cone surface defined by a locus of the apex due to precessing motion of said rotor relative to the member; and

a means for establishing the relative precessing motion at a defined angular velocity ratio;

wherein a space defined in the spherical space of the casing and having its volume changed by relative precessing motion between said member and said rotor serves as a working space; the relative precessing motion between said member and rotor has an angular velocity ratio of $\omega:\omega'=1:(1-1/n)$ where ω represents a planetary rotation velocity of a spin axis of one of said member and rotor, ω' represents a spin velocity of the spin axis per se, and n is a natural number of 2 or more and equal to the number of apexes in the rotor; and the casing includes at least one pair of inlet and outlet ports in the spherical wall.

4,877,380

CONTROL SYSTEM FOR CONTROLLING THE INTERNAL VOLUME IN A ROTARY COMPRESSOR

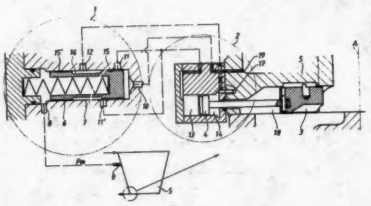
Rune Gianvall, Norrköping, Sweden, assignor to Stal Refrigeration AB, Norrköping, Sweden

Filed Mar. 2, 1988, Ser. No. 162,954
Claims priority, application Sweden, Mar. 4, 1987, 8700900
Int. Cl.[4] F04B *49/02;* **F04C** *18/16*
U.S. Cl. 417—310 **2 Claims**

1. A control system for controlling the positioning of a valve body with respect to an outlet gate of an operating chamber of a rotary compressor to thereby adjust the internal volume of the rotary compressor, said rotary compressor providing a first outlet port for fluid medium at a low pressure, a second outlet port for fluid medium at a high pressure and a third outlet port for fluid medium at an intermediate pressure, said control system comprising

an operating device which includes a housing means forming a cylindrical operating chamber; a piston which is movable within said operating chamber and which divides said operating chamber into first and second chamber spaces; a piston rod which extends from said piston through said second chamber space and connects with said valve body; said second chamber space communicating with said first outlet port of said rotary compressor,

a control device which includes a housing means forming a cylindrical control chamber having first and second ends, said housing means providing a first opening communicating with said control chamber near said first end thereof, a second opening communcating with said control chamber about halfway between said first and second ends thereof, third and fourth openings communicating with said control chamber near said second end thereof, and a fifth opening at said second end of said control chamber; a plunger which is movable within said control chamber, said plunger having a first end portion which faces said first end of said control chamber, an opposite second end portion which can block said third and fourth openings,



and a middle portion of reduced diameter which is in register with said second opening, and spring means biasing said plunger towards said second end of said control chamber,

first conduit means connecting said first opening with said third outlet port,

second conduit means connecting said second opening with said first outlet port,

third conduit means connecting said third and fourth openings with said first chamber space of said operating device, and

fourth conduit means connecting said fifth opening with said second outlet port,

the positioning of said valve body being determined by the relative pressures of fluid medium in said first and second chamber spaces of said operating chamber, which in turn is controlled by the positioning of the plunger in said control chamber.

4,877,381

COMPRESSOR SHAFT COLLAR THROUGH PORT FOR PRESSURE EQUALIZATION BETWEEN FLUID POCKETS

William C. Johnson, Onsted, and Hubert Richardson, Jr., Brooklyn, both of Mich., assignors to Tecumseh Products Company, Tecumseh, Mich.

Filed May 12, 1988, Ser. No. 193,750
Int. Cl.[4] F04C *18/04, 29/02;* **F01M** *11/02;* **F16C** *32/06*
U.S. Cl. 418—55 **19 Claims**

1. A hermetic compressor, comprising:

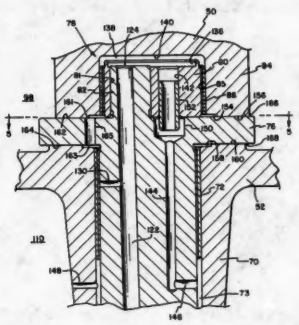
a housing;

compressor means within said housing for compressing refrigerant fluid;

a rotatable crankshaft including an axial shaft portion and a radially extending plate portion, said plate portion having a top surface and a bottom surface;

a first annular pocket of fluid adjacent said top surface and a second annular pocket of fluid adjacent said bottom surface, said first and second pockets being circumjacent said shaft portion, the radially outermost boundary of each of

said first and second pockets being radially inward from a perimeter edge of said plate portion; and



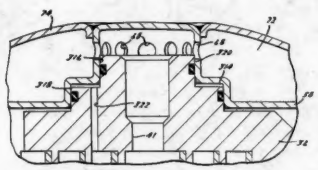
pressure equalization means in said crankshaft for providing fluid communication between said first pocket and said second pocket such that said first and second pockets of fluid are at substantially equal pressures.

4,877,382

SCROLL-TYPE MACHINE WITH AXIALLY COMPLIANT MOUNTING

Jean-Luc M. Caillat; Roger C. Weatherston, both of Dayton, and James W. Bush, Sidney, all of Ohio, assignors to Copeland Corporation, Sidney, Ohio

Division of Ser. No. 899,003, Aug. 23, 1986, Pat. No. 4,767,293. This application May 2, 1988, Ser. No. 189,485
Int. Cl.[4] F01C *1/04, 19/08*
U.S. Cl. 418—55 **34 Claims**



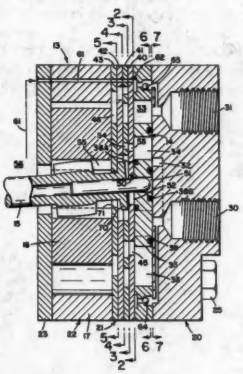
1. A scroll-type machine comprising:
(a) a first scroll member having a spiral wrap thereon;
(b) a second scroll member having a spiral wrap thereon;
(c) support means for mounting said scroll members with said spiral wraps intermeshing with one another, said first scroll member being mounted for non-orbital movement with respect to said support means, and said second scroll member being mounted for orbital movement with respect to said support means and said first scroll member whereby said orbital movement will cause said wraps to define moving fluid pockets communicating between a low pressure and a high pressure; and
(d) biasing means for biasing said first scroll member toward said second scroll member, said biasing means comprising
means defining a first chamber containing fluid at a first pressure; and
means defining a second chamber containing a fluid at a second pressure;
said first and second pressures being greater than said low pressure;
said first and second chambers being positioned such that said fluid at said first pressure and said fluid at said second pressure cooperate to exert a biasing force on said first scroll member in a direction toward said second scroll member and generally parallel to the axis of said orbital movement to thereby enhance sealing therebetween.

4,877,383

DEVICE HAVING A SEALED CONTROL OPENING AND AN ORBITING VALVE

Hollis N. White, Jr., 243 Pyle La., Hopkinsville, Ky. 42240

Continuation of Ser. No. 80,606, Aug. 3, 1987, abandoned. This application Dec. 12, 1988, Ser. No. 282,675
Int. Cl.[4] F01C *1/10, 19/08;* **F17K** *3/02*
U.S. Cl. 418—61.3 **9 Claims**



1. An improvement for a device having a housing with a stationary body and an orbiting valve selectively interconnecting fluid of two ports to expanding and contracting motor cells through bi-directional fluid passages through the stationary body of the housing of the device, the orbiting valve directly rotated by an orbiting drive shaft extending through a central opening of the device to connect to the valve with the diameter of the central opening being larger than the diameter of the drive shaft extending therethrough, the improvement of the addition of a means to seal the central opening from the fluid, in the orbiting valve.

9. An improvement for a device having an orbiting valve having a central opening selectively interconnecting fluid of a port to expanding and contracting cells, the central opening being between a central section and an outside edge connected by radial arms having a width, and the orbiting valve moving against a surface, the improvement comprising means in the surface to allow fluid to bypass the arms of the orbiting valve, said means including passages having a circumferential width greater than the width of the radial arms of the valve.

4,877,384

VANE TYPE ROTARY COMPRESSOR

Jen-Yeh Chu, No. 75-2, Feng Jen Street, Chi-Lung City, Taiwan

Filed May 16, 1988, Ser. No. 194,964
Int. Cl.[4] F04C *15/02, 29/08*
U.S. Cl. 418—184 **5 Claims**

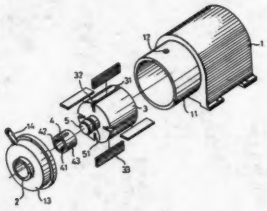
1. A vane-type rotary compressor comprising;
a cylinder (11) having an upper gas inlet (12) at a selected location in its circumference;
a rotor (3) eccentrically mounted in a lower portion of said cylinder spaced away from said gas inlet, said rotor having a plurality of circumferentially spaced radial slots therein, each slot having a notch near an outer end thereof on a leading side of said slot in a direction of rotation of said rotor;
motor means connected to said rotor for rotating said rotor in the rotational direction;

a vane (33) slidably mounted in each of said slots, each vane being slidable outwardly against an inner surface of said cylinder for defining

gas chambers between said vanes and between an outer surface of said rotor and the inner surface of said cylinder;

an end plate (13) fixed to and closing said cylinder, said end plate having an arc shaped groove (15) in a position to be covered by an end surface of said rotor, said arc shaped groove being in the path of said notches with rotation of said rotor, said end plate having a hub cavity (2) which is centered with a center of rotation for said rotor, said end plate including a discharging passage communicating with said cavity, an unloading passage communicating with said cavity and an expelling passage communicating with said cavity, said passages being circumferentialy spaced around said cavity;

a sliding ring (4) mounted for axial movement in said cavity, said sliding ring being fixed against rotation to said end plate, said sliding ring having a discharging hole (42)



therethrough at one axial end of said ring, an unloading hole (43) therethrough at on opposite axial end of said ring, and an expelling hole (41) therethrough which is large enough to always be in communication with said arc shaped groove despite the axial

position of said ring, said expelling hole always overlapping 100% of said expelling passage despite the axial position of said ring, said discharging hole overlapping by between 0 and 100% of said discharging passage depending on the axial position of said ring and said unloading hole overlapping by 100% to 0% of said unloading passage depending on the axial position of said ring, said unloading passage being 100% overlapped by said unloading hole when said discharging passage is 0% overlapped by said discharging hole; and

a shaft end (5) connected to said rotor and extending outwardly from the center of rotation of said rotar into sliding contact with an inner surface of said ring, said shaft end having an annular groove (51) therein for establishing communication between said holes of said ring.

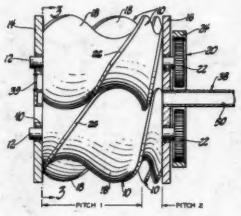
4,877,385

POSITIVE DISPLACEMENT ROTARY MECHANISM

Constantinos A. Koromilas, Utica, Mich., assignor to General Motors Corporation, Detroit, Mich.

Division of Ser. No. 5,077, Jan. 20, 1987, Pat. No. 4,782,802.
This application Jul. 22, 1988, Ser. No. 222,880
Int. Cl.[4] F02B *53/00*
U.S. Cl. 418—197 **1 Claim**

1. A positive displacement rotary mechanism comprising four essentially identical rotary helical intermeshing lobes with parallel axes and identical helical surfaces extending between axially spaced ends thereof, a four-sided stationary cylindrical member extending centrally of said lobes and parallel to said axes, said helical surfaces having a varying pitch and a cross sectional profile as viewed axially having at least two convex circular apexes joined by convex circular sides such that said helical surfaces cooperate through close apex-to-side and apex-to-apex relationships therebetween and also cooperate with the sides of said cylindrical member through close apex relationship therewith to define a repetitive working space internal of said lobes having boundaries along and between said lobes and along and between said lobes and said cylindrical member which boundaries move on rotation of said lobes to effect expansion and contraction of said working space while repeti-



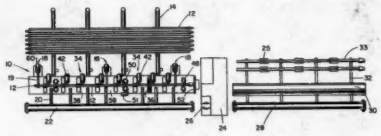
tively moving same from one of said ends of said lobes toward the other end, and said stationary member having an exhaust passage extending therethrough with an opening to said working space.

4,877,386

AUTOMATED SUCKER ROD CLEANING APPARATUS

Robert B. Hinds, Borger; Charles B. Hutchinson, Jr., Fritch, and James S. Dowell, Phillips, all of Tex., assignors to J.M. Huber Corporation, Rumson, N.J.

Filed Dec. 20, 1988, Ser. No. 287,414
Int. Cl.[4] B29C *45/14*; B08B *1/04*
U.S. Cl. 425—110 **11 Claims**



1. In an automated system for molding a polymer rod guide onto an oilfield sucker rod, the system including a rod feeding means, an apparatus for cleaning a pre-determined section of the rod to receive the rod guide, a conveying means for conveying the cleaned rod and an injection molding apparatus for receiving the clean rod and molding a rod guide thereon, the rod cleaning apparatus comprising:

a substantially linear member having a member axis and secured to a frame, the linear member moveable along the member axis;

a means for reciprocating the linear member along the member axis a pre-selected stroke distance;

a means for rotating a rod to be cleaned about a rod axis substantially parallel the member axis;

a plurality of guide rollers mounted on the frame on radially opposite sides of the rod axis and spaced radially together sufficiently close to rotatably support the rod therebetween along the rod axis to secure the rod in position for cleaning; and

a brush assembly releasably mounted on the linear member, the brush assembly including;

a rotatable wire brush on a shaft for engaging and cleaning a point on the rod,

a rotationally powered shaft for rotating the brush when the brush is engaged against the rod, and

a brush support for releasably mounting the brush at a preselected point along the linear member,

so that when the brush assembly is releasably mounted at a preselected point on the reciprocating linear member and a brush is engaged against the rod and rotated, the move-

ment of the reciprocating linear member cleans a predetermined length of the rod.

4,877,387

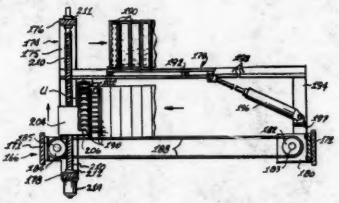
AUTOMATIC CONTINUOUSLY CYCLEABLE MOLDING SYSTEM

Richardus H. J. Fierkens, Herwen, and Ireneus J. T. M. Pas, Rozendaal, both of Netherlands, assignors to ASM Fico Tooling, b.v., Herwen, Netherlands

Division of Ser. No. 586,855, Mar. 6, 1984, Pat. No. 4,575,328. This application Nov. 15, 1985, Ser. No. 798,677

Int. Cl.[4] B29C *39/04, 39/10*

U.S. Cl. 425—116 3 Claims



1. A multi-station molding system for use with bottom and top molds that are assembleable into mold sets, said system comprising:

a means for placing at least one package which comprises a lead frame and a semiconductor chip into a cavity located within said bottom and top molds;

a means for inserting molding material into said cavity to encapsulate, in liquid form, said semiconductor chip of said package, said means for inserting being operably separate from said means for placing;

a means for curing said liquid molding material to form a solid encapsulation of said semiconductor chip during cycling and transporting away from said means for inserting of said bottom and top molds assembled together with said package located therein, said means for curing having clamp means coupled to a plurality of walking beams for holding together said bottom and top molds during said cycling and being operably separate from said means for placing and said means for inserting; and

a means for positioning said package for removal therefrom.

4,877,388

MOLD CLAMPING APPARATUS IN AN INJECTION MOLDING MACHINE

Yoshiharu Inaba, Kawasaki, and Shigeo Tokunaga, Hino, both of Japan, assignors to Fanuc Ltd., Minamitsuru, Japan

PCT No. PCT/JP87/00577, § 371 Date Mar. 8, 1988, § 102(e) Date Mar. 8, 1988, PCT Pub. No. WO88/01225, PCT Pub. Date Feb. 25, 1988

PCT Filed Jul. 31, 1987, Ser. No. 183,736

Claims priority, application Japan, Aug. 11, 1986, 61-186967

The portion of the term of this patent subsequent to May 3, 2005, has been disclaimed.

Int. Cl.[4] B29C *45/66*

U.S. Cl. 425—150 3 Claims

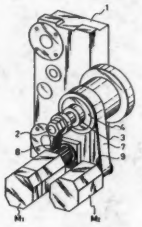
1. A mold clamping apparatus having a fixed platen, a movable platen and a spindle operatively connected to the moving platen, for use in an injection molding machine which is controlled by a host controller, comprising:

a plurality of servomotors for driving the spindle;

coupling means for coupling each of said servomotors to the spindle;

detecting means for detecting at least one of a rotational position and a rotational speed of one of said servomotors and producing an output signal indicative of said detected position or speed;

a control circuit for generating a torque command signal in accordance with a difference between said output signal from said detecting means indicative of the detected position or speed and a command signal from the host controller; and



driving circuits for driving corresponding servomotors, in accordance with said torque command signal supplied from said control cicuit, said driving circuits corresponding in number to that of said plurality of servomotors.

4,877,389

LOCKING APPARATUS FOR LOCKING A DETACHABLY MOUNTED PLASTICIZING CYLINDER OF A PLASTICIZING UNIT IN OPERATIVE POSITION TO A CARRYING BLOCK OF AN INJECTION UNIT OF AN INJECTION MOLDING MACHINE

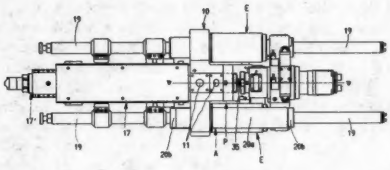
Karl Hehl, Arthur-Hehl-Str. 32, D-7298 Lossburg 1, Fed. Rep. of Germany

Filed Oct. 12, 1988, Ser. No. 256,609

Claims priority, application Fed. Rep. of Germany, Oct. 22, 1987, 3735769

Int. Cl.[4] B29C *45/03, 45/62, 45/50*

U.S. Cl. 425—190 9 Claims



1. In an injection molding machine having a locking apparatus for locking a detachably mounted plasticizing cylinder in an operative position to a carrying block of an injecting unit of said machine, which locking apparatus has a vertical longitudinal plane of symmetry and comprises

two sliders, which are arranged on opposite sides of the axis of said plasticizing cylinder and are arranged to be radially movable on said cylinder for a movement between a locking position for positively locking said plasticizing cylinder in said operative position to said carrying block, and an unlocking position, which is defined by a stop and in which said sliders release said plasticizing cylinder for its removal from said carrying block, and

hydraulic unlocking cylinder means, which are operatively connected to said sliders and operable to move said sliders from said locking position to said unlocking position,

the improvement wherein

said unlocking cylinder means comprise two unlocking cylinders, which are disposed on opposite sides of said

plane of symmetry and are symmetrical to one another with respect to said plane,

said sliders consist of a clamping slider and backing slider,

each of said unlocking cylinders comprises two functional parts consisting of a cylinder proper and a piston and piston rod,

one of said functional parts of each of said unlocking cylinders is integrated in said clamping slider,

the other of said functional parts of each said unlocking cylinders protrudes from said clamping slider and is secured to said backing slider.

4,877,390

DEGASSIFICATION DEVICE FOR A SCREW EXTRUDER WHICH PROCESSES PLASTIC MATERIAL

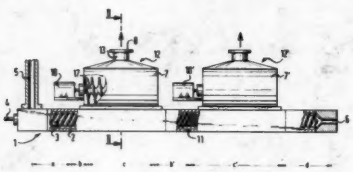
Herbert Ocker, Leonberg, and Gerhard Weihrich, Illingen, both of Fed. Rep. of Germany, assignors to Werner & Pfleiderer GmbH, Stuttgart, Fed. Rep. of Germany

Filed Apr. 1, 1988, Ser. No. 176,703

Claims priority, application Fed. Rep. of Germany, Apr. 3, 1987, 3711328

Int. Cl.[4] B29C *47/76*

U.S. Cl. 425—203 14 Claims



1. A degassification device for a screw extruder which processes plastic material, the extruder having a hollow housing and an extruder screw rotatable in the housing, said degassification device comprising a pair of degassification screws disposed adjacent to said extruder screw for rotation about axes parallel to the axis of rotation of the extruder screw, a housing headpiece accommodating said degassification screws and having an opening in comunication with an opening provided in the extruder housing such that gas and vapor produced in the extruder housing can flow radially therefrom into the housing headpiece, said housing headpiece having an outlet for discharge of said gas and vapor, said degassification screws having threads which interengage one another, means for driving the degassification screws in the same direction of rotation, said housing headpiece having adjacent longitudinal bores which overlap one another and respectively receive said degassification screws therein with their threads interengaged with one another, said threads having outer peripheral surfaces which confront, in close proximity, the inner surface of the housing headpiece around the overlapped bores, said degassification screws each comprising a spiral thread without a shaft having a length and cross sectonal profile such that upon rotation of the screws, the overlapped bores in the housing headpiece are longitudinally and transversely traversed by said screws substantially in entirety, the outer peripheral surfaces of the threads of the degassification screws being radially spaced from the outer peripheral surface of the extruder screw such that the threads of the degassification screw do not intermesh with the threads of the extruder screw.

4,877,391

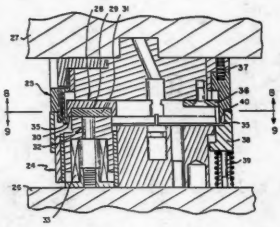
APPARATUS FOR SCORING RIGID PLASTIC SHEET MATERIAL

Edward E. Batson, Mesa, and John H. Kurz, Scottsdale, both of Ariz., assignors to WMF Container Corporation, Phoenix, Ariz.

Division of Ser. No. 4,818,461, Aug. 11, 1986, which is a continuation-in-part of Ser. No. 774,225, Sep. 9, 1985, abandoned. This application Aug. 18, 1988, Ser. No. 233,583

Int. Cl.[4] B29C *43/40*

U.S. Cl. 425—289 6 Claims



1. An apparatus for forming frangible score lines in rigid plastic sheet material comprising:

(a) a flat surface;

(b) a scoring means having means to move said scoring means to strike downwardly on a sheet of rigid plastic material overlying said flat surface;

(c) a serrated edge located on said flat surface, said serrated edge having points and notches; and,

(d) means to control the distance of travel of said scoring means relative to said flat surface such that when said scoring means strikes downwardly on said sheet of rigid plastic material overlying said flat surface and said serrated edge the points of said serrated edge will extend into said sheet of rigid plastic material a distance further than the notches of said serrated edge to form a corrugated fracturable score line in said plastic sheet material.

4,877,392

ARRANGEMENT FOR APPLYING SURFACE PRESSURE TO CONTINUOUSLY MOVING WORKPIECE WEBS

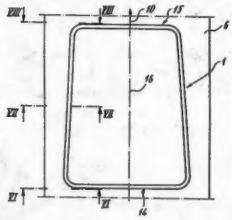
Raoul De Brock, Kortrijk, Belgium, assignor to Akzo NV, Arnhem, Netherlands

Filed Jun. 27, 1988, Ser. No. 211,696

Claims priority, application Fed. Rep. of Germany, Jul. 4, 1987, 3722157

Int. Cl.[4] B29C *43/48, 43/22*

U.S. Cl. 425—371 6 Claims



1. An arrangement for applying a surface pressure to continuously moving workpiece webs, such as laminates, comprising at least one movable pressing band arranged to be pressed against a workpiece web by a pressure medium; means forming

a pressure chamber which has a supply side and a discharge side so that said pressing band is movable in a direction from said supply side into said pressure chamber to be first heated and softened and then to be cooled and hardened and then further in the direction of movement to said discharge side, said means including a sealing frame which has a contour defining an enclosed region; means for applying pressure to said frame in a direction towards said pressing band, said sealing frame having a transverse frame portion located at said supply side, a transverse frame portion located at said discharge side and longitudinal frame portions and extending therebetween in the direction of movement and converging from said supply side to said discharge side so that said transverse frame portion at said discharge side has a smaller width than said transverse frame portion at said supply side.

4,877,393

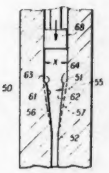
APPARATUS FOR PRODUCING BIAXIALLY ORIENTED POLYMER SHEET

Ying-Cheng Lo, Bethlehem, Pa., assignor to Aluminum Company of America, Alcoa Center, Pa.

Division of Ser. No. 806,994, Dec. 9, 1985, Pat. No. 4,789,514. This application Nov. 30, 1988, Ser. No. 277,815

Int. Cl.[4] B29C *43/48, 47/54*

U.S. Cl. 425—383 **7 Claims**



1. An apparatus for producing biaxially oriented polymer sheet from a workpiece of semi-crystalline polymer material having inboard and outboard portions, wherein the workpiece has a first lateral dimension extending in a first lateral direction; a second lateral dimension oriented in a direction normal to the first lateral dimension and extending in a second lateral direction, and a longitudinal dimension extending in a longitudinal direction normal to both first and second lateral dimensions, the apparatus comprising:

means for applying a force to the workpiece in the longitudinal direction to move the workpiece from an upstream position to a downstream position;

means for confining the workpiece while the force is applied, wherein the material of the workpiece flows in directions having components parallel to the first and second lateral dimensions and parallel to the longitudinal dimension of the workpiece, the confining means including rigid surfaces which converge toward one another in a direction parallel to the first lateral dimension of the workpiece while expanding in a direction parallel to the second lateral dimension of the workpiece, the rigid surfaces terminating to define an outlet opening having a rectangular cross-section; the rigid surfaces which converge toward one another having rigid protrusion means thereon for squeezing inboard portions of the workpiece more than outboard portions, and means for maintaining a continuous convex surface while the material is confined; whereby the material of the workpiece flows bidirectionally to produce the biaxially oriented polymer sheet.

4,877,394

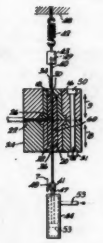
APPARATUS FOR MOLDING PARTS HAVING SMALL DIAMETER HOLE

Richard H. McFarlane, Geneva, Ill., assignor to Taut Inc., Geneva, Ill.

Division of Ser. No. 302,490, Sep. 16, 1981, abandoned. This application May 23, 1983, Ser. No. 496,894

Int. Cl.[4] B29C *45/03, 45/27*

U.S. Cl. 425—567 **7 Claims**



1. An apparatus for molding a long tubular plastic piece of thin wall thickness which includes a central coaxial hole extending therethrough along the length thereof, said apparatus comprising:

(a) a mold comprising a first and a second mating mold part positionable into mating engagement with one another and structured when so positioned to define a mold cavity within said mold,

(b) said mold cavity having an interior longitudinal dimension between opposite ends thereof substantially equal to the length of the resulting plastic piece,

(c) said mold including a passageway having a predetermined transverse dimension located at each of said opposite ends of said mold cavity and in communicating relation between said mold cavity and the exterior of said mold,

(d) each passageway disposed in coaxial relation with one another and with a central longitudinal axis of said mold cavity,

(e) a wire core including an intermediate portion disposed within said mold cavity and extending the length thereof and in coaxial relation to said mold cavity,

(f) said wire core including a first end and a second end extending from said intermediate portion, each of said ends disposed to pass through one of said passageways and extend outwardly from said mold cavity so as to be exteriorly accessible relative thereto,

(g) tension applying means for tensioning said wire core and located in spaced relation to and exteriorly of said mold and including a first tensioning means and a second tensioning means secured to said first exteriorly accessible end of said core and said second exteriorly accessible end of said core respectively for applying tension thereto,

(h) said first tensioning means anchored in place and structured to maintain and resist any force applied to said wire core, said second tensioning means structured to selectively apply an adjustable axially directed tensioning force to said second exteriorly accessible end and against said first tensioning means,

(i) plastic injection means mounted at least in part on said mold and in communicating relation with said mold cavity, said plastic injection means structured and disposed for directing flowable plastic material into said cavity and about said wire core,

(j) said second tensioning means adapted to subsequently adjust axial force applied to said second exteriorly accessible end to compensate for distorting pressures on said wire

core subsequent to the injection of plastic material within said cavity, and

(k) said wire core disposed and maintained in a straight line coaxial orientation relative to said mold cavity during molding formation of the plastic material into said plastic piece.

4,877,395

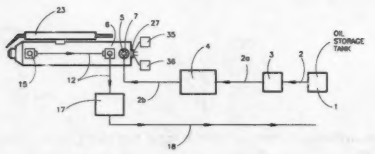
SYSTEM CONTROL MEANS TO PREHEAT WASTE OIL FOR COMBUSTION

Gary Schubach, South 4805 Farr Rd., Spokane, Wash. 99206, and Frank Schubach, N. 1406 Aladdin Rd., Spokane, Wash. 99016

Division of Ser. No. 65,919, Jun. 22, 1987, Pat. No. 4,797,089. This application Oct. 4, 1988, Ser. No. 253,268

Int. Cl.[4] F23N *5/00*

U.S. Cl. 431—28 **3 Claims**



1. A waste oil burner feed system apparatus for preheating and then controlling the temperature of fuel oil for the atomization of the fuel oil in cooperation with a waste oil burner, comprising:

a heat transfer assembly which includes a helical oil passageway through an elongated aluminum heat transfer body, which receives heat from a heating element operatively connected to it, and which distributes the heat to fuel oil within its helical oil passageway;

an oil supply line in constant communication with the helical oil passageway in the heat transfer assembly and consequently in constant communication with an atomization nozzle which is securable at a terminal end of the heat transfer assembly;

an oil expansion and pressure relief means which prevents expanding fuel oil from passing through the atomization nozzle on cold startup and prior to the fuel oil attaining a temperature of a pre-selected value, and which prevents fuel oil from passing through the atomization nozzle as a result of residual pressure exerted during the operation cycle after a shutdown, by means of associated configuration of the heat transfer assembly in cooperation with the atomization nozzle and an adjacent pressure relief line in constant communication therewith; and

a system control means for cold startup to energize only the heating element, until the heat transfer assembly adjacent to the atomization nozzle attains a temperature of a preselected value, at which time said system control means energizes a fuel oil pump means, energizes an air blower, and energizes a means of igniting the atomized fuel oil exiting the aperture of the atomization nozzle.

4,877,396

INDUSTRIAL BURNER WITH CYLINDRICAL CERAMIC RECUPERATIVE AIR PREHEATER

Joachim Wunning, Leonberg, Fed. Rep. of Germany, assignor to WS Wärmeprozesstechnik GmbH, Renningen, Fed. Rep. of Germany

Filed Dec. 29, 1988, Ser. No. 291,744

Claims priority, application European Pat. Off., Jan. 15, 1988, 88100498.0

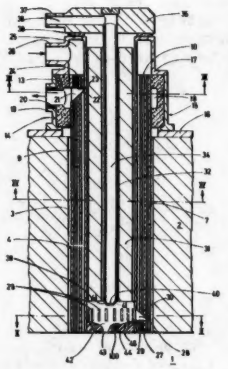
Int. Cl.[4] F23R *3/00*; F23D *11/44*

U.S. Cl. 431—158 **21 Claims**

1. Industrial burner means for heating furnaces and other high heat treatment installation having recuperative air-preheating means and a combustion chamber means (42) constructed of ceramic material providing for an input thereto of fuel and air and a hot gas exit in the form of jet-producing nozzle means (43), and wherein:

said recuperative air-preheating means is constituted as a substantially cylindrical centrally hollow body (4, 4*a*, 4*b*) of ceramic material disposed coaxially with said combustion chamber means (42) and said nozzle means (43) thereof and of tubular construction containing a multiplicity of longitudinal channels for countercurrent flow of combustion-supporting air and combustion product gas through respective sets of channels (9, 10) interleaved for provision of wall parts capable of thermally coupling said respective sets of channels, said channels of said set for flow of combustion supporting air being connected a supply manifold of a source of said air flow located at an axial extremity of said substantially cylindrical body of tubular construction opposite to an axial extremity thereof connected to said combustion chamber means;

said channels (9, 10) of both of said sets of channels in said



hollow cylindrical body being distributed annularly next to one another interleaved sets about the longitudinal axis of said hollow cylindrical body;

said hollow cylindrical body having an inner substantially cylindrical jacket wall (5) surrounding an inner substantially cylindrical space (6), and said combustion chamber means (42) being provided either directly at a said end of said hollow cylindrical body or in a position utilizing an end portion of said substantially cylindrical space for at least a portion of said combustion chamber means;

at least a portion of said channels (10) of said set for flow of combustion supporting air being connected at their flow output ends to said combustion chamber means and all of said channels (10) of said air flow set having outflow orifices at an end of said hollow cylindrical body in the vicinity of said combustion chamber means (42), and

said nozzle means (43) being constituted, at least in part by structure either passing through said hollow cylindrical body or connected to said hollow cylindrical body or both passing through said hollow cylindrical body and connected thereto.

4,877,397

PLANT FOR MANUFACTURING CEMENT CLINKER

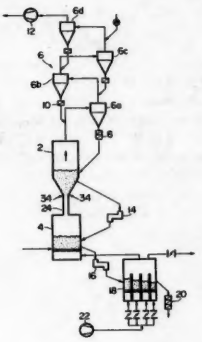
June Tatebayashi, Takarazuka; Tomoaki Takada, Tokyo; Kimitaka Hayashi, Kakogawa, and Chikanori Kumagai, Kobe, all of Japan, assignors to Kawasaki Jukogyo Kabushiki Kaisha, Japan

Filed Feb. 9, 1988, Ser. No. 154,433

Claims priority, application Japan, Apr. 1, 1986, 61-75131; Aug. 29, 1986, 61-204302; Nov. 21, 1986, 61-279468

Int. Cl.[4] F27B *15/00*

U.S. Cl. 432—106 18 Claims



1. A plant for manufacturing cement clinker comprising:

a suspension preheater in which a cement material powder is preheated;

granulating and sintering means for granulating and sintering the preheated cement material powder including a spouted bed furnace section provided with a spouted bed;

said spouted bed furnace section having a straight barrel portion, a conical portion formed below said straight barrel portion, and a central throat portion connected to the bottom end portion of said conical portion so as to blow combustion air upwardly into said conical portion;

a plurality of burners disposed in a region in the vicinity of the juncture between the conical portion and the central throat portion, and arranged to direct fuel along paths upwardly inclined and converging on a central axis of said spouted bed furnace section, whereby the fuel when burned produces a local hot region in which the cement material powder is granulated directly above the central throat portion, the local hot region having a temperature substantially higher than at a peripheral region of said spouted bed furnace section;

a charging chute provided slightly above the local hot region and charging the preheated cement material powder from the suspension preheater into said furnace section; and

a discharge chute disposed on one side of the local hot region through which the cement material powder which has been at least granulated is discharged from said furnace section.

4,877,398

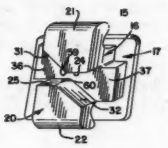
BRACKET FOR PERMITTING TIPPING AND LIMITING UPRIGHTING

Peter C. Kesling, La Porte, Ind., assignor to TP Orthodontics, Inc., Westville, Ind.

Continuation-in-part of Ser. No. 39,530, Apr. 16, 1987, abandoned, which is a continuation-in-part of Ser. No. 879,072, Jun. 26, 1986, abandoned. This application Jun. 4, 1987, Ser. No. 54,837

Int. Cl.[4] A61C *3/00*

U.S. Cl. 433—8 23 Claims



1. An orthodontic bracket mountable on the crown of a tooth and coacting with a generally passive archwire extending substantially parallel to the occlusal plane, said bracket having a body with a horizontally opening archwire slot with means coacting with said archwire for crown tipping including fulcrum means, and means coacting with said archwire for limiting root uprighting, said crown tipping means having at least one surface extending at an angle relative to the occlusal plane, said means limiting root uprighting having at least one surface extending parallel to the occlusal plane, whereby said bracket is mesiodistally pivotal on the archwire about a generally horizontal axis, and said slot and archwire being sized so that the archwire substantially fills the area between the fulcrum means and the root uprighting limiting means when the tooth is uprighted.

4,877,399

DENTAL EQUIPMENT CLEANING APPARATUS AND METHOD

Glenn R. Frank, New Fairfield, and Edward T. Stewart, Jr., New Milford, both of Conn., assignors to Robert Thomas Ltd., Media, Pa.

Filed Jun. 13, 1988, Ser. No. 205,735

Int. Cl.[4] A61C *1/05*

U.S. Cl. 433—25 2 Claims

1. For use in combination with an air driven turbine-type dental handpiece, wherein the handpiece has an upper portion containing the turbine, a first opening for receiving a drill or other dental instrument, and a lower portion terminating in connecting means, and wherein said handpiece has an internal channel for transmitting drive air to the turbine extending from said turbine to said connecting means, and cleaning water and cleaning air channels extending internally within said hand-

piece from openings adjacent said first opening to said connecting means,

the improvement comprising,

an adapter for removing debris from said cleaning water and cleaning air channels within said handpiece, said adapter having:

(a) a fitting having means for connecting the fitting to said connecting means of the handpiece;

(b) an insert positioned within said fitting, said insert having means for blocking the flow of drive air to the handpiece, said insert also having first and second channels respectively aligned to communicate with said cleaning water and cleaning air channels of said handpiece, and,

(c) means for introducing pressurized air into said fitting and into said first and second channels thereof and thence through said cleaning water and cleaning air channels of said handpiece,

whereby said pressurized air removes debris from said cleaning water and cleaning air channels of said handpiece.

4,877,400

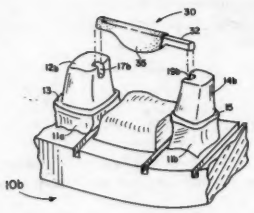
DENTAL BRIDGE AND METHOD

Linda A. Holsclaw, 2420 Forest Meadow, Lewisville, Tex. 75067

Filed Jun. 24, 1988, Ser. No. 210,802

Int. Cl.[4] A61C *13/22*

U.S. Cl. 433—183 **12 Claims**



1. A method of constructing a dental bridge for a patient having a pair of reduced and prepared abutment teeth and a space therebetween, said preparation including forming a first notch in the distal portion of the occlusal surface of the mesial abutment tooth and a second notch in the mesial occlusal surface of the distal abutment tooth, and for which teeth an impression has been made, comprising the steps of:

(a) forming a master model from said impression;

(b) forming first and second dies of the modeled abutment teeth;

(c) forming a refractory model from the master model;

(d) making a pontic rod to fit in and between said first and second notches of said refractory model;

(e) disposing said pontic rod in said first and second notches of the refractory model;

(f) covering the refractory model abutment teeth and pontic rod with a mix of porcelain;

(g) baking said refractory model to cure porcelain mix;

(h) building a crown of porcelain over each of the refractory model abutment teeth, and at least one pontic of porcelain over the pontic rod to form the dental bridge;

(i) baking the crowns and the pontic; and

(j) removing the dental bridge from the refractory model.

4,877,401

METHOD OF PREVENTING TOOTH DECAY BY LASER BEAM IRRADIATION AND CHEMICAL TREATMENT

William I. Higuchi; Jeffrey I. Fox, and G. Lynn Powell, all of Salt Lake City, Utah, assignors to University of Utah, Salt Lake City, Utah

Filed Mar. 9, 1988, Ser. No. 165,807

Int. Cl.[4] A61K *6/00, 7/16*

U.S. Cl. 433—215 **8 Claims**

1. A method of treating a tooth comprising: irradiated said tooth with a laser beam at a power ranging from

about 20 watts to about 50 watts for a period of time

ranging from about 1 second to about 400 seconds; and

thereafter applying ethane-1-hydroxy-1, 1 diphosphonic acid as a dissolution rate-inhibiting agent to said tooth, said dissolution rate inhibiting agent being in a sufficient concentration to decrease the dissolution rate of that tooth.

4,877,402

ARTIFICIAL TOOTH CROWN AND METHOD OF PRODUCING THE SAME

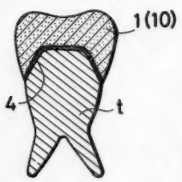
Masaya Hirabayashi, and Iwao Noda, both of Shiga, Japan, assignors to Kyocera Corporation, Kyoto, Japan

Continuation of Ser. No. 922,825, Oct. 22, 1986, abandoned, which is a continuation of Ser. No. 654,654, Sep. 25, 1984, abandoned. This application Jul. 1, 1988, Ser. No. 217,145

Claims priority, application Japan, Sep. 26, 1983, 58-178962

Int. Cl.[4] A61C *5/08*

U.S. Cl. 433—218 **11 Claims**



1. An artificial tooth crown for attachment to a tooth of a dental patient, comprising a body consisting of a glass ceramic, wherein said glass ceramic comprises a generally transparent glass matrix and at least 30% by volume of crystallized calcium phosphate crystals, said body being prepared by casting followed by crystallization at a temperature of between about 800° and 900° C.

4,877,403

PROCESS, AND DEVICE FOR FIRING AND BATTLE SIMULATION

Lothar Jürgens, Hamburg, Fed. Rep. of Germany, assignor to Precitronic Gesellschaft fur Feinmechanik und Electronic mbh, Hamburg, Fed. Rep. of Germany

Filed Sep. 2, 1988, Ser. No. 239,733

Claims priority, application Fed. Rep. of Germany, Sep. 3, 1987, 3729483

Int. Cl.[4] F41F *27/00*

U.S. Cl. 434—24 **15 Claims**

1. A practice cartridge for use in simulating firing in a firing system having a firing mechanism including an electrically conductive pin, the practice cartridge comprising:

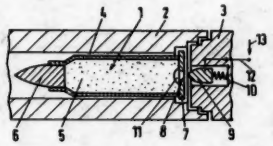
a cartridge body having a breach-facing wall, the body being sized to fit within the firing system;

first and second spaced apart electrically conductive electrodes disposed on said breach-facing wall a distance apart less than a transverse dimension of the pin in the firing mechanism;

means for providing a voltage within the cartridge body;

said first electrode being switchably connected to said means for providing when the firing mechanism includes a pin unconnected to an external voltage source, such that actuating the firing system causes the pin to complete an electric circuit between the first and second electrodes thereby providing a voltage to the second electrode;

said first electrode being switchably disconnected from said



means for providing when the firing mechanism includes a pin connected to an external voltage source, such that actuating the firing system causes the pin to contact said second electrode thereby providing a voltage to the second electrode;

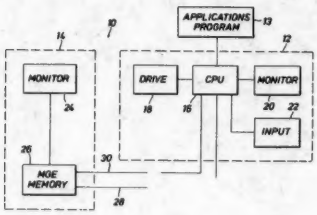
means, disposed within the cartridge body, for detecting the presence of a voltage on said second electrode, the detected voltage signaling the firing of the system.

4,877,404

GRAPHICAL INTERACTIVE SOFTWARE SYSTEM

Bruce A. Warren, and Dana L. Webb, both of Lake Jackson, Tex., assignors to Warren-Forthought, Inc., Angleton, Tex.

Filed Jan. 4, 1988, Ser. No. 140,404
Int. Cl.[4] G09B *19/00*
U.S. Cl. 434—118 **15 Claims**



1. An interactive computer software system permitting a user to take a pre-selected computer course or access a pictorial data base, comprising:

(a) a host computer sub-system including CPU means for executing computer programs, means for entering the data into the system, and display means for displaying the input data;

(b) means for loading said pre-selected computer course in said host computer sub-system;

(c) a graphics computer sub-system operatively connected to said host computer sub-system, said graphics computer sub-system executing said course upon interrogation by said host computer sub-system wherein said course includes a series of interrelated pictures displayed by said graphics computer sub-system, said series of pictures defining a course responsive to input data from the user and interactively dialoguing with the user as the user progresses through said pre-selected course or data base; and

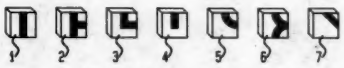
(d) wherein said pre-selected computer course comprises a distributed program embedded in said series of interrelated pictures.

4,877,405

SYSTEM OF MODULES FOR COMPOSING ALPHANUMERICS

Mark R. Stewart, 60 Pleasant St. #2, Cambridge, Mass. 02139

Continuation of Ser. No. 911,219, Sep. 24, 1986, abandoned. This application Mar. 7, 1988, Ser. No. 165,180
Int. Cl.[4] G09B *1/00*
U.S. Cl. 434—160 **21 Claims**



1. A system of modules for constructing alphanumeric characters and decorative and figurative designs by assembling such modules in a coplanar array, comprising:

a group of modules, each being shaped so that said modules can be assembled in a coplanar array in an adjacent manner, each module having a major surface circumscribed by a plurality of straight edges,

each module having at least one line segment thereon which extends from a fixed point on at least one of said straight edges intermediate the ends thereof and which contrasts with the rest of said major surface,

said modules being of seven different types and having respectively seven different line segment patterns thereon, said seven different line segment patterns having the following configurations:

(a) a straight line transversing said major surface from a point between the ends of one edge to an opposite edge,

(b) a straight line transversing said major surface from a point between the ends of one edge to an opposite edge and another straight line extending from a point between the ends of said first straight line at approximately a right angle to said line and extending to an edge not intersected by said first straight line,

(c) two straight line segments, each originating at a point between the ends of two adjacent edges and meeting at approximately a right angle at a point spaced from the edges of said major surface,

(d) a straight line originating at a point between the ends of one edge and extending at approximately a right angle to such edge, said line segment terminating at a point spaced from the edges of said major surface,

(e) a curved line having an end at a point between the ends of each of two adjacent edges, said curved line providing an arc which contains substantially one quadrant of said major surface,

(f) two curved lines, each originating at a point between the ends of each of two opposite edges and providing an arc from said points to a point between the ends of one edge between said opposite edges, each said arc substantially containing an adjacent quadrent of said major surface, and

(g) a straight line extending from a point substantially in the middle of one edge to a point substantially in the middle of an adjacent edge, said line extending at an angle of approximately 45 degrees to each of said edges, and such that said line will line up with any line on any of said modules,

whereby, by using only said seven types of modules, one can form any Latin alphabetic character or any Arabic numeral in a coplanar array.

4,877,406

MANIPULATABLE, SPHERICAL EDUCATIONAL AND AMUSEMENT DEVICES

Howard J. Wilk, 1600 Church Rd. Apt. A307, Wyncote, Pa. 19095-1920

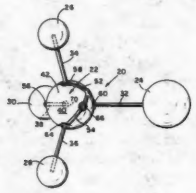
Filed Nov. 4, 1988, Ser. No. 267,215
Int. Cl.[4] G09B *23/26*; A63F *9/08*
U.S. Cl. 434—278 **20 Claims**

1. An educational device comprising:

first sphere means for defining at least first and second crossing great circle channels;

second sphere means concentrically surrounded by the first sphere means for defining at least third and fourth great circle channels crossing each other and crossing under the first and second great circle channels;

a plurality of inserts extending radially at least from the second sphere means through the first sphere means, a first channel portion of each insert being received in and mov-



able along one of the first and second great circle channels and a second channel portion of each insert being simultaneously receivable in and movable along one of the third and fourth great circle channels, the plurality of inserts being arranged such that each o the great circle channels receives at least one of the inserts; and

at least one of the first and second sphere means being rotatable with respect to the other of the sphere means through movement of the inserts.

4,877,407

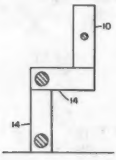
STACKABLE BLOCKS

Benjamin F. du Pont, Rockland, Del., and Carl J. Sukeforth, Lexington, Mass., assignors to Benjamin F. Du Pont, Rockland, Del.

Continuation of Ser. No. 800,527, Nov. 21, 1985, abandoned. This application May 25, 1988, Ser. No. 201,396

Int. Cl.[4] A63F *9/00*

U.S. Cl. 434—302 **7 Claims**



1. A set of blocks that are stackable and restackable in different configurations, each block arranged to rest stably only when its center of mass lies vertically above a part of the block which is supported,

at least some blocks each having a frame and a weight within the frame arranged so that the center of mass of the block is at a location that differs from the location the center of mass would have if the block had a uniform distribution of mass, the weight in at least one of the blocks being significantly heavier than the frame,

different blocks having different masses,

at least some of the blocks each bearing a mark which symbolizes the relative magnitude of the weight and the location of the weight and hence the location of the center of mass of the block.

4,877,408

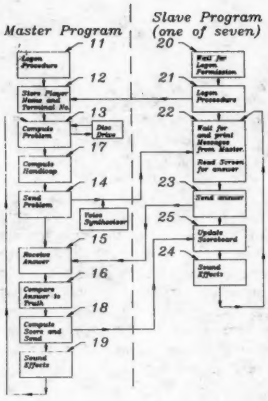
COMPETITIVE COMPUTER EDUCATIONAL GAME

Ben W. Hartsfield, Rte. 3, Morrison, Tenn. 37357

Filed Feb. 9, 1988, Ser. No. 153,954

Int. Cl.[4] G09B *5/00*

U.S. Cl. 434—350 **10 Claims**



1. A competitive computer educational game for teaching a plurality of students in the classroom enviornment, utilizing a computer network where all students are simultaneously asked a question, each student having access to an input device with which to enter an answer, with a master computer asking the questions and keeping score, and comprising: a means of providing a continuously updated handicap to the faster students in order to encourage the slower students to maintain an interest in the learning process.

4,877,409

HINGED ELECTRICAL CONNECTOR

Junichi Tanigawa, Kawasaki, and Shoji Kikuchi, Hiratsuka, both of Japan, assignors to AMP Incorporated, Harrisburg, Pa.

Filed Dec. 8, 1988, Ser. No. 281,435

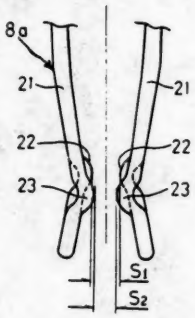
Claims priority, application Japan, Jan. 22, 1988, 63-12425

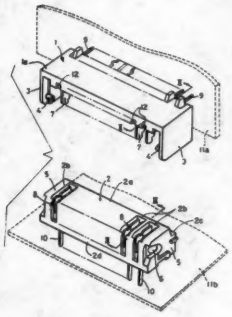
Int. Cl.[4] H01R *13/193, 23/70*

U.S. Cl. 439—31 **9 Claims**

1. A hinged electrical connector comprising first and second connector members having first and second dielectric housings, electrical tab contacts secured in the first housing and electrical receptacle contacts secured in the second housing, the tab contacts and the receptacle contacts having termination sections for electrical connection to circuit boards, shafts of one connector member being disposed within recesses of the other connector member for hingedly mounting the one connector member to the other connector member and tab contact sections of the tab contacts being electrically engaged between receptacle contact sections of the receptacle contacts, characterized in that the receptacle contact sections have low-pressure contact members and high-pressure contact members, the high-pressure contact members being spaced apart a distance which is less than the spacing between the low-pressure

contact members, said tab contact sections having outer ends which are electrically engaged between the low-pressure contact members of the receptacle contact sections when the circuit boards are at a first position relative to one another and the tab contact sections have inner sections which are electrically engaged between the high-pressure contact members of the receptacle contact sections when the circuit boards are at a second position relative to one another.





4,877,410
PROCESS FOR TANNING FISH SKIN

Francesco Renzulli; Antonio Del Gaudio, and Piero Renzulli, all of Napoli, Italy, assignors to CO.GE.IT. S.R.L. - Costruzioni Generali Italiane, Napoli, Italy

Filed Feb. 26, 1987, Ser. No. 19,014
Claims priority, application Italy, Mar. 7, 1986, 47736 A/86
Int. Cl.[4] C14C *3/00*
U.S. Cl. 8—94.12 24 Claims

1. A process for treating fish skins comprising in sequence:
(a) introducing into a rotable apparatus for the processing of skins an amount of cold water which is between 1 time and 8 times the weight of the skins to be processed; and an amount of salt which is between 2% and 30% by weight of the weight of the skins;
(b) rotating the apparatus for a period between 2 and 45 minutes;
(c) introducing fish skins to be processed into the apparatus and rotating the apparatus for a period between 5 minutes and 1 hour;
(d) introducing into the apparatus an amount of disinfectant which is between 1% and 10% by weight of the weight of the skins, such disinfectant being compatible and having preservation properties with respect to the skins; and rotating the apparatus for a period between 5 minutes and 1 hour;
(e) introducing into the apparatus an amount of emulsifying agent which is between 0.3% and 5% by weight of the weight of the skins, and rotating the drum-tumbler for a period between 5 minutes and 1 hour;
(f) removing the entire contents of the apparatus;
(g) removing the flesh residue attached to the skins;
(h) weighing the cleaned skins to obtain a partially processed skin weight;
(i) reintroducing into the apparatus the cleaned skins, an amount of water which is between 0.5 and 6 times the partially processed skin weight and an amount of salt so as to obtain a degree Baume (B°) of approximately 6.5;
(j) rotating the apparatus for a period between 2 and 30 minutes;
(k) introducing into the apparatus formic acid progressively until a pH value between 3 and 4 is obtained, and rotating the apparatus for a period between 10 minutes and 1 hour;
(l) introducing into the apparatus while it is at a standstill, an amount of chromium which is between 3% and 30% by weight of the partially processed skin weight;
(m) rotating the apparatus for a period between 1 hour and 20 hours;
(n) allowing the entire contents of the apparatus to settle for approximately 12 hours;
(o) removing the entire contents of the apparatus;
(p) washing the removed skins with water;
(q) arranging the skins, on a supporting device and allowing them to rest for at least 36 hours, whereby a tanned fish skin is formed.

4,877,411
METHOD FOR COLOR MOUNTING THE LEVEL OF FINISH APPLIED TO TEXTILE MATERIALS AND FOR COLOR CODING TEXTILE MATERIALS: AMINE-REDUCIBLE FUGITIVE TINTS

John B. Hines, and Jeffery R. Harris, both of Spartanburg, S.C., assignors to Milliken Research Corporation, Spartanburg, S.C.

Filed Aug. 29, 1988, Ser. No. 237,478
Int. Cl.[4] D06P *5/13*
U.S. Cl. 8—403 13 Claims

1. A method for temporary coloration of textile materials, which comprises applying to said textile material, an amine-reducible tint in an amount sufficient to provide coloration to said textile material, said tint being characterized by the formula:

$$R\{A\text{-}[alkyleneoxy\ constituent)_n X]_m\}_p$$

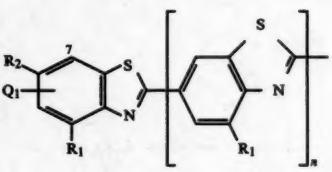
wherein RA is the organic, amine-reducible dyestuff radical selected from triarylmethane, cyanine, hemicyanine, azacyanine or methine dyestuff radicals, A is a linking moiety in said organic, easily reduced dyestuff radical selected from the group consisting of —N—, —O—, —S—, or $—CO_2—$, the alkylene moiety of said alkyleneoxy constituent contains from 2 to about 4 carbon atoms, n is an integer of from 2 to about 300, m is 1 when A is —O—, —S—, $—CO_2—$ and 2 when A is —N—, p is an integer of from 1 to 5, and X is a member of the group consisting of —H—, -alkyl, -alkylcarboxylate, or -arylcarboxylate; and contacting said amine-reducible tint with an amine compound in an amount sufficient to reduce said tint whereby said coloration of said textile material is removed.

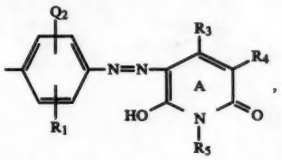
4,877,412
SULFO GROUP-CONTAINING MONOAZO COMPOUNDS HAVING AN UNSUBSTITUTED OR SUBSTITUTED 4-(BENZOTHIAZOL-2'-YL)PHENYL OR 4-(6'-BENZOTHIAZOL-2'YL)-BENZOTHIAZOL-2'-YL)PHENYLDIAZO COMPONENT RADICAL AND A 6-HYDROXYPYRID-2-ONE COUPLING COMPONENT RADICAL

Reinhard Pedrazzi, Allschwil, Switzerland, assignor to Sandoz Ltd., Basel, Switzerland

Continuation of Ser. No. 30,948, Mar. 26, 1987, abandoned, which is a continuation-in-part of Ser. No. 877,659, May 19, 1986, abandoned. This application Mar. 31, 1988, Ser. No. 183,566
Claims priority, application Fed. Rep. of Germany, Sep. 22, 1984, 3434921
Int. Cl.[4] C09B *29/01, 44/08;* D06P *1/02;* D21H *3/80*
U.S. Cl. 8—437 20 Claims

1. A compound of the formula





or an internal, external or acid addition salt thereof, wherein each of Q_1 and Q_2 is independently hydrogen or $—SO_3M_1$, each R_1 and R_2 is independently hydrogen, C_{1-4}alkyl, C_{1-4}alkoxy or —COOM,

R_3 is hydrogen; cyano; amino; hydroxy; C_{1-4}-alkoxy; C_{1-4}alkyl; C_{2-4}alkyl monosubstituted by hydroxy or C_{1-4}alkoxy; C_{5-6}cycloalkyl; phenyl; phenyl substituted by 1 to 3 substituents selected from C_{1-4}alkyl, C_{1-4}-alkoxy, halo, —COOM and $—SO_3M$; phenyl(C_{1-4}-alkyl); phenyl(C_{1-4}alkyl) the phenyl group of which is substituted by 1 to 3 substituents selected from C_{1-4}alkyl, C_{1-4}alkoxy, halo, —COOM and $—SO_3M$; —CO—R_6; $—(CH_2)_b—R_7$; or a saturated or unsaturated 5- or 6-membered heterocyclic ring containing 1 to 3 hetero atoms, which ring is unsubstituted or substituted by 1 to 3 C_{1-4}alkyl groups and is bound to Ring A by a carbon or nitrogen atom directly or via a bridge member, with the proviso that any

is bound via a bridge member, wherein

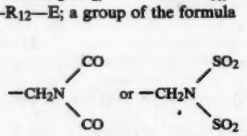
R_6 is hydroxy, amino or C_{1-4}alkoxy,

R_7 is cyano, halo, $-SO_3M$, $-OSO_3M$, $-CO-R_8$ or pyridyl-4, wherein

R_8 is hydroxy; amino; C_{1-4}alkyl; C_{1-4}alkyl monosubstituted by hydroxy, halo, cyano or C_{1-4}alkoxy; C_{1-4}-alkoxy; phenyl; phenyl substituted by 1 to 3 substituents selected from C_{1-4}alkyl, C_{1-4}-alkoxy, halo, —COOM and $-SO_3M$; phenoxy; phenyl(C_{1-4}alkyl); or phenoxy or phenyl-(C_{1-4}alkyl) the phenyl group of which is substituted by 1 to 3 substituents selected from C_{1-4}alkyl, C_{1-4}-alkoxy, halo —COOM and $-SO_3M$, and

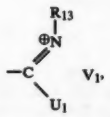
b is 1, 2 or 3,

R_4 is hydrogen; cyano; halo; $-SO_3M$; nitroso; nitro; $-NR_9R_{10}$; C_{1-4}alkyl; C_{1-4}alkyl monosubstituted by hydroxy, halo, cyano, C_{1-4}alkoxy, phenyl, $-SO_3M$ or —O-SO_3M; $-SO_2NH_2$; $-CO-R_{11}$; $-CH_2-N(-R_{13})-CO-R_{12}-E$; a group of the formula



wherein the two carbonyl or sulfonyl groups are bound to two carbon atoms of an aromatic ring that are ortho to each other; a group of the formula

which is a 5- or 6-membered ring containing 1 to 3 hetero atoms which is unsubstituted or substituted by 1 or 2 methyl groups or by amino, C_{1-4}alkylamino or N,N-di-(C_{1-4}alkyl)amino; benzoimidazolium-1; benzoimidazolium-1 monosubstituted by methyl, amino, methylamino or dimethylamino; or a group of the formula



wherein

each of R_9 and R_{10} is independently hydrogen; C_{1-4}alkyl; C_{1-4}alkyl monosubstituted by hydroxy, halo, cyano, C_{1-4}alkoxy or phenyl; or $-CO-R_{12}-E$,

R_{11} is hydroxy; amino; C_{1-4}alkyl-amino; N,N-di-(C_{1-4}alkyl)amino; C_{1-4}alkyl; C_{1-4}alkoxy; phenyl; phenyl substituted by 1 to 3 substituents selected from C_{1-4}-alkyl, C_{1-4}alkoxy, halo, —COOM and $-SO_3M$; phenoxy; or phenoxy the phenyl group of which is substituted by 1 to 3 substituents selected from C_{1-4}alkyl, C_{1-4}-alkoxy, halo, —COOM and $-SO_3M$,

R_{13} is hydrogen, C_{1-4}alkyl or C_{1-4}-alkyl monosubstituted by hydroxy, halo, cyano, C_{1-4}alkoxy or phenyl,

U_1 is —S—, —NH— or

and

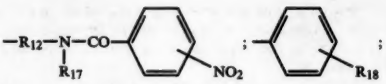
V_1 is a radical which, together with the

radical, forms a 5-or 6-membered ring or a 5- or 6-membered ring fused to a 5- or 6-membered carbocyclic ring or to a 5- or 6-membered heterocyclic ring containing 1 or 2 hetero atoms, or

R_3 and R_4 taken together form a 3 or 4 carbon atom chain or a 3 or 4 carbon atom chain that forms part of a further 5- or 6-membered ring by 2 vicinal chain members, and

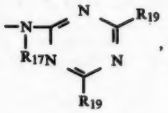
R_5 is hydrogen; $-NR_{14}R_{15}$; C_{1-6}alkyl; C_{2-4}-alkenyl; C_{2-4}alkynyl; C_{1-6}alkyl monosubstituted by hydroxy, cyano, C_{1-4}alkoxy, acetamido, —CO—R_{16}, $-SO_3M$ or —O-SO_3M; C_{5-6}cycloalkyl; phenyl; phenyl substituted by 1 to 3 substituents selected from C_{1-4}alkyl, C_{1-4}-alkoxy, halo, nitro, amino, —COOM and $-SO_3M$; phenyl(C_{1-4}alkyl); phenyl(C_{1-4}alkyl) the phenyl group of which is substituted by 1 to 3 substituents selected from C_{1-4}alkyl, C_{1-4}alkoxy, halo, nitro, amino,

—COOM and $-SO_3M$; $-R_{12}-E_1$;



or a saturated or unsaturated 5- or 6-membered heterocyclic ring containing 1 or 2 hetero atoms, which ring is unsubstituted or substituted by 1 to 3 methyl groups or by amino, C_{1-4}alkylamino or N,N-di-(C_{1-4}alkyl)-amino and is bound by a carbon or nitrogen atom, wherein

E_1 is a protonatable amino group, a quaternary ammonium group, a hydrazinium group or



wherein

each R_{19} is independently halo, amino or an aliphatic amino group,

each of R_{14} and R_{15} is independently hydrogen; C_{1-4}alkyl; C_{1-4}alkyl monosubstituted by hydroxy, halo, cyano or C_{1-4}alkoxy; phenyl; or phenyl substituted by 1 or 2 substituents selected from halo, C_{1-4}alkyl and C_{1-4}alkoxy,

R_{16} is hydroxy or C_{1-4}alkoxy, and

R_{18} is E_2, $-NH-CO-R_{12}-E_2$, $-SO_2-NH-R_{12}-E_2$ or $-CO-NH-R_{12}-E_2$, wherein

is a protonatable amino group, a quaternary ammonium group or a hydrazinium group, and

n is 0 or 1,

wherein

each E is independently hydrogen, halo, a protonatable

amino group, a quaternary ammonium group, a hydrazinium group, $—SO_3M$ or $—OSO_3M$,

each R_{12} is independently linear or branched C_{1-6}-alkylene, and

each R_{17} is independently hydrogen or C_{1-4}alkyl,

wherein

each M and M_1 is independently hydrogen or a non-chromophoric cation, and

each halo is independently fluoro, chloro or bromo,

with the provisos that (i) the compound contains at least one $—SO_3M$ or $—SO_3M_1$ group, (ii) at least one of R_4 and R_5 is hydrogen, (iii) the total number of anionic groups equals or exceeds the total number of basic and cationic groups, (iv) the positive charge of each cationic group is balanced by the negative charge of an $—SO_3^{\ominus}$ or $—COO^{\ominus}$ group of the molecule or of an external non-chromophoric anion, and (v) the hydroxy group of any hydroxyalkyl group attached to a nitrogen atom is in other than the 1-position.

4,877,413

PROCESS FOR THE END-TO-END DYEING OF CELLULOSIC FIBRES

Jean-Marie Sire, Hégenheim, France, and Peter Scheibli, Bottmingen, Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed Mar. 26, 1987, Ser. No. 30,188

Claims priority, application Switzerland, Apr. 7, 1986, 1347/86

Int. Cl.[4] C09B *62/00*; D06M *13/34*

U.S. Cl. 8—543 **35 Claims**

1. A process for the uniform end-to-end dyeing of dyeing of cellulosic materials, or blends that contain cellulose, with direct or reactive dyes by the pad dyeing process, which comprises treating said cellulosic materials or blends with an aqueous liquor that contains at least one water-soluble direct or reactive dye and an effective amount of at least one water-soluble anionic colourless organic compound containing a carboxy or sulfonic acid group and having an affinity factor A, at a concentration of 0.2 to 0.3 g/l, for mercerised cotton of 1.1 to 4, said factor A being the quotient of the concentration of the water-soluble, colourless organic compound in a liquor without addition of dye, before impregnation, divided by the concentration of the water-soluble, colourless organic compound in the liquor without dye after impregnation.

4,877,414

FUEL COMPOSITIONS

Kenneth Mekonen, 5601 N. Quincy Ave., Kansas City, Mo. 64119

Filed Mar. 31, 1988, Ser. No. 176,186

Int. Cl.[4] C10L *1/32*

U.S. Cl. 44—51 **41 Claims**

1. A hydrosol fuel comprising from about 67% to 94% by weight of a hydrocarbon combustible fuel selected from the group consisting of the gasolines, diesel fuels and heavy fuel oils, from 5 to 25% by weight of water, at least one surfactant operable to create a hydrosol with the fuel and water present in the range of 1.0 to 2.5 weight percent, and from 0.1 up to about 3.4% by weight of an additive selected from the group consisting of alpha (mono) olefins and alkyl benzenes, each of the former having 7 to 15 recurring CH_2 monomers therein.

4,877,415

HYDROCARBON COMPOSITIONS CONTAINING POLYOLEFIN GRAFT POLYMERS

Maria M. Kapuscinski, Carmel; Larry D. Grina, Wappingers Falls; Ronald E. Jones, Glenham, and Rodney L. Sung, Fishkill, all of N.Y., assignors to Texaco Inc., White Plains, N.Y.

Division of Ser. No. 726,567, Apr. 24, 1985, Pat. No. 4,820,776. This application Jul. 22, 1988, Ser. No. 222,872

Int. Cl.[4] C10L *1/14*

U.S. Cl. 44—62 **12 Claims**

1. A hydrocarbon fuel composition comprising a major portion of a hydrocarbon fuel and a dispersing amount of a graft polymer comprising an oil-soluble, substantially linear, carbon-carbon backbone polymer having bonded thereto (i) first graft units derived from a first dispersant monomer amine containing a polymerizable, ethylenically unsaturated double bond and (ii) second units derived from a phenothiazine.

4,877,416

SYNERGISTIC FUEL COMPOSITIONS

Curtis B. Campbell, Rodeo, Calif., assignor to Chevron Research Company, San Francisco, Calif.

Filed Nov. 18, 1987, Ser. No. 121,986

Int. Cl.[4] C10L *1/18, 1/22*

U.S. Cl. 44—62 **12 Claims**

1. A fuel composition comprising a major portion of hydrocarbons boiling in the gasoline range and (a) from about 0.001% by weight to about 1.0% by weight of a hydrocarbyl-substituted amine or polyamine having an average molecular weight of about 750 to about 10,000 and also having at least one basic nitrogen atom, and (b) a hydrocarbyl-terminated poly(oxyalkylene) monool having an average molecular weight from about 500 to 5000 wherein said oxyalkylene group of the hydrocarbyl-terminated poly(oxyalkylene) monool is a $C_2$to C_5 oxyalkylene group and the hydrocarbyl group of said hydrocarbyl-terminated poly(oxyalkylene) monool is a C_7–C_{30} alkylphenyl group and wherein the weight percent of hydrocarbyl-terminated poly(oxyalkylene) monool in the fuel composition ranges from about 0.01 to 100 times the amount of hydrocarbyl-substituted amine or polyamine.

4,877,417

ARTIFICIAL FIREPLACE LOG

Robert J. Crace, Brentwood, Tenn., assignor to Crace Associates, Inc., Ocala, Fla.

Filed Mar. 3, 1988, Ser. No. 164,066

The portion of the term of this patent subsequent to Nov. 29, 2005, has been disclaimed.

Int. Cl.[4] C10L *11/00*

U.S. Cl. 44—535 **13 Claims**

11. A partially combustible fireplace log which maintains the appearance of a fireplace log after said partial combustion comprising from about 30 percent to 80 percent by weight of clay, about 20 percent to 70 percent by weight of at least one non-fluid combustible material, and about 1 to 15 percent by weight of a nitrate, and about 1 to 5 percent by weight of borax.

4,877,418

BRIQUETTE TREATMENT PROCESS

Joseph Goleczka, Cheltenham; Walter Harris, and John Pringle, both of Tewkesbury, all of England, assignors to Coal Industry (Patents) Limited, United Kingdom

Filed Nov. 6, 1987, Ser. No. 117,559

Claims priority, application United Kingdom, Dec. 2, 1986, 8628733

Int. Cl.[4] C10L *10/00*

U.S. Cl. 44—600 **5 Claims**

1. A process for the reduction of the efflorescence in a formed and shaped coal briquettes, comprising:

applying to the briquettes after formation thereof an aqueous solution of a medium viscosity polyvinyl alcohol of a concentration of greater than 0.4 and up to 2% of polyvinyl alcohol solids by weight.

4,877,419

STRIPPING AND DEPRESSURIZATION OF SOLIDS AND GAS MIXTURE

Thomas S. Dewitz, Houston, Tex., assignor to Shell Oil Company, Houston, Tex.

Filed Sep. 18, 1987, Ser. No. 98,180
Int. Cl.[4] C10J 3/84
U.S. Cl. 48—197 R 5 Claims

1. A method for stripping and depressurizing fine particulates mixed with gas discharged from a vessel operated at elevated temperature and pressure conditions, said method comprising the steps of:

receiving and conveying said mixture from said vessel;

stripping said particulates of entrained synthesis gas by selectively injecting gas into a means for receiving and conveying said mixture from said vessel;

maintaining a substantially constant fraction of gas volume to particulates volume in said means for receiving and conveying said mixture;

maintaining a higher pressure at a lower end of said means for receiving and conveying said mixture than the pressure of said vessel, said maintaining a higher pressure includes actuating valving means located at a lower portion of said means for receiving and conveying said mixture;

decreasing the pressure in said means for receiving and conveying said mixture downstream from said lower end, said decreasing the pressure includes gradually increasing the diameter of said means for receiving and conveying said mixture downstream from said lower end;

controlling the mass flow rate of said mixture discharged from said means for receiving and conveying said mixture, said controlling includes determining the mass flow rate of said mixture downstream of said selectively injecting gas into said means for receiving and conveying said mixture, comparing said mass flow rate with a preselected mass flow rate, and adjusting said mass flow rate.

4,877,420

HALOGEN-CONTAINING FILLERS FOR ABRASIVE BODIES, IN PARTICULAR FOR GRINDING WHEELS OR CUTTING WHEELS, TO A PROCESS FOR THE PRODUCTION OF THESE FILLERS AND TO ABRASIVE BODIES CONTAINING THEM

Lother Buxbaum, Landskron, and Helmut Stessel, Arnoldstein, both of Austria, assignors to BBU-Chemie Gesellschaft m.b.H, Arnoldstein, Austria

Filed Jul. 14, 1988, Ser. No. 219,549
Claims priority, application Austria, Jul. 17, 1987, 1810/87
Int. Cl.[4] C09C 1/02
U.S. Cl. 51—309 22 Claims

1. A halogen-containing filler for abrasive bodies comprising:

(a) at least one halogen-containing member selected from the group consisting of:

(1) metal halides or metal complex salts of the formula

$$A_xMe_y^{II}Me_z^{III}Hal_E.nB_fC_gHal_e.mH_2O.oNH_3$$

wherein
A is an alkali metal or ammonium,
x is a number from 0 to 10,
Me^{II} is Mn, Ca, Mg, Zn, Sn, Cu, Co or Ni,
y is a number from 0 to 2,
Me^{III} is Al, B or Ti,
z is a number from 0 to 2,
Hal is a halogen,
E is a number from 1 to 10,
n is a number from 0 to 10,
B is an lkali metal or ammonium,
f is a number from 0 to 1,
C is Ca, Mg, Zn, Sn or Mn,
g is a number from 0 to 1,
e is a number from 1 to 2,
m is a number from 0 to 10 and
o is a number from 0 to 10;

(2) alkali chloroferrates of the formula

$$A_xFe_y^{++}Fe_z^{+++}Cl_{x+2y+3z}$$

wherein
A is an alkali metal or ammonium,
x is a number from 1 to 10,
y is a number from zero to 1,
z is a number from zero to 1, with the proviso that y and z cannot be zero at the same time; and

(3) mixtures of a basic aluminum chloride and at least one chloride selected from the group consisting of NaCl and KCl; and

(b) at least one additive compound selected from the group consisting of:

(1) fluorine compounds, and

(2) salts of an oxygen acid selected from the group consisting of the oxygen acids of nitrogen, phosphorous, sulfur and combinations thereof.

4,877,421

TREATMENT OF PERMEABLE MEMBRANES

Benjamin Bikson, Brookline, and Salvatore Giglia, Norwood, both of Mass., assignors to Union Carbide Corporation, Danbury, Conn.

Filed Nov. 2, 1987, Ser. No. 115,927
Int. Cl.[4] B01D 53/22
U.S. Cl. 55—16 16 Claims

1. A process for restoring the permeability characteristics of a gas separation membrane that has suffered degradation upon use in gas separation operations, without deleterious effect on the selectivity thereof, said membrane being capable of selectively permeating a more readily permeable component of a feed gas mixture containing said more readily permeable component and a less readily permeable component, said membrane having been dried to remove solvents employed in the preparation thereof prior to use in gas separation operations, said process consisting essentially of:

(a) removing said gas separation membrane from service after a period of use in gas separation operations, during which time the permeability characteristics of the membrane, with respect to the more readily permeable component of the feed gas mixture, has suffered degradation as compared to said permeability characteristics of the membrane at the time it was placed in service due to the deposition of impurities thereon from said feed gas mixture during said period of use; and

(b) heat treating said gas separation membrane at a temperature of from about 50° C. to about 140° C. to remove said deposited impurities therefrom, said heat treating being continued for a period of time on the order of from about 0.5 to about 3 hours, whereby the permeability characteristics of the membrane are restored without deleterious effect on the selectivity characteristics thereof.

4,877,422

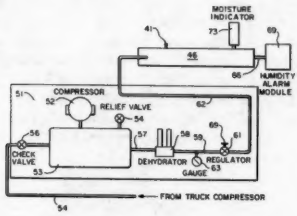
MOBILE AERIAL LIFT WITH BOOM STRUCTURE HAVING INSULATED BOOM SECTION CONTAINING A CLEAN, MOISTURE FREE ENVIRONMENT AND METHOD

Van J. Walbridge, Arvada, and R. Michael Donohue, Berthoud, both of Colo., assignors to GK Technologies, Inc., Woodcliff Lake, N.J.

Filed Nov. 1, 1988, Ser. No. 265,508
Int. Cl.[4] B01D 53/04
U.S. Cl. 55—20 11 Claims

1. In a mobile aerial lift, a vehicle, a boom structure mounted on the vehicle having an outer extremity, a workman's basket mounted on the outer extremity, control means carried by the

boom structure and accessible to the workman's basket for controlling operation of the boom structure, the boom structure having an insulated boom section, means providing enclosed space for at least a portion of the insulated boom section, and means for supplying a gas under positive pressure to the enclosed space to provide a clean, relatively moisture-free environment for a portion of the interior of the insulated boom section to maintain the electrical insulating properties of the insulated boom section.



4,877,423

METHOD AND DEVICE FOR COOLING FLUE DUST

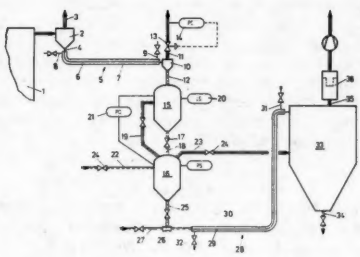
Frank Dziobek, and Horst Möllenhoff, both of Mülheim, Fed. Rep. of Germany, assignors to Deutsche Babcock Werke Aktiengesellschaft, Oberhausen, Fed. Rep. of Germany

Filed Oct. 14, 1988, Ser. No. 257,992

Claims priority, application Fed. Rep. of Germany, Oct. 28, 1987, 3736521

Int. Cl.[4] B01D *53/24*

U.S. Cl. 55—27 **4 Claims**



1. A method of cooling flue dust precipitated from compressed flue gas from a fluidized bed of a combustion chamber comprising the steps of:

pneumatically conveying flue gas containing dust through at least one pipe to an air-lock system;

cooling said pipes externally so that the flue gas is at a temperature above the dew point of water and acid present in the flue gas;

separating said dust from said flue gas before entering said air-lock system;

removing said dust from said air lock system and conveying said dust by air therefrom; and

cooling said dust to a final predetermined temperature by a coolant.

4,877,424

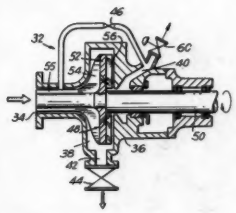
METHOD AND APPARATUS FOR SEPARATING SOLIDS FROM A SOLIDS-GAS MIXTURE

Markku Perkola, 35 Walker La., Glens Falls, N.Y. 12801, and Ilkka Seppa, 261 Blackberry Hill Dr., Wakefield, R.I. 02879

Filed Feb. 26, 1988, Ser. No. 160,669

Int. Cl.[4] B01D *19/00*

U.S. Cl. 55—52 **21 Claims**



1. In a centrifugal pump of use in the degasification of a gas and solids containing flowable material and including an inlet for the flowable material and an outlet for gas separated from the flowable material, a fluidizing rotor having radially extending open blades and being disposed for driven rotation about its center for generating a degasifying centrifugal force and having a substantially disk-shaped radially extending back plate, said back plate having a front side and a rear side, a plurality of air passages defined in and through said back plate and through which gas separated from the flowable material travels from the front side to the rear side of said back plate for discharge through said outlet, said passages extending from said front and said rear side of the back plate in a direction angled radially inwardly in the direction of flow and toward the center of said rotor and counter to the centrifugal forces generated by the rotating rotor; and said outlet being located behind the back plate and in fluid communication with said air passages for permitting the separated air to travel therethrough.

4,877,425

NOVEL METAL-DIKETONE ABSORBENTS FOR CARBON MONOXIDE

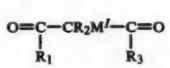
John A. T. Norman, Whitehall, and Robert E. Stevens, Emmaus, both of Pa., assignors to Air Products and Chemicals, Inc., Allentown, Pa.

Continuation-in-part of Ser. No. 167,605, Mar. 14, 1988, which is a division of Ser. No. 83,742, Aug. 7, 1987, abandoned. This application Oct. 17, 1988, Ser. No. 258,741

Int. Cl.[4] B01D *53/14*

U.S. Cl. 55—68 **7 Claims**

1. A process for removing carbon monoxide from a feedstream containing at least one other component, said process comprising contacting said feedstream with a compound of the formula:



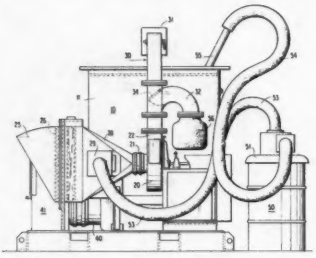
wherein R_1 is trichloromethyl or R_F; R_F is C_nF_{2n+1} and n is 1–8; R_2 is H or hydrocarbyl of 2–20 carbon atoms having at least one olefinic unsaturated bond; R_3 is hydrocarbyl of 2–20 carbon atoms having at least one olefinic unsaturated bond and M^I is Cu^I or Ag^I, whereby said compound selectively absorbs carbon monoxide to remove it from the feedstream.

4,877,426

METHOD AND APPARATUS FOR UNLOADING VAPOR ADSORBERS

Harry W. Robertson, IV, Covington, Va., assignor to Westvaco Corporation, New York, N.Y.

Filed Nov. 14, 1988, Ser. No. 270,815
Int. Cl.[4] B01D *53/02*
U.S. Cl. 55—74 6 Claims



3. A method for removing spent adsorbent particles from a gas adsorption device having vessel means to contain a particulate adsorption bed, fan means to energize the flow of gas through said adsorption bed, first duct means to confine gas flow into said fan means and second duct means to confine gas flow from said fan means into said vessel means, said method comprising the steps of:

connecting said first duct means to draw gas flow from vacuum receiver means;

connecting a vacuum pickup wand with said vacuum receiver means for drawing gas therethrough;

disconnecting said second duct means from said vessel means;

exposing said adsorption bed to external accessibility; and,

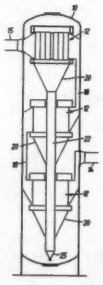
manipulating said pickup wand within said adsorption bed to draft the particulate constituency of said adsorption bed into said vacuum receiver means.

4,877,427

DRY ELECTROSTATIC PRECIPITATOR

Charles G. Smith, West Bromwich, and Terence B. F. Cottrell, nr. Walsall, both of England, assignors to Dresser U.K. Limited, A British Company, London, England

Filed May 9, 1988, Ser. No. 191,501
Claims priority, application United Kingdom, May 15, 1987, 8711487
Int. Cl.[4] B03C *3/00*
U.S. Cl. 55—136 4 Claims



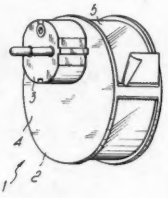
1. A dry electrostatic precipitator for removing dust particulates from a flowing gas stream and comprising an upright cylindrical vessel, a plurality of precipitator stages secured vertically spaced within said cylindrical vessel, each of said precipitator stages having particulate charging electrodes and associated collector electrodes and arranged in a controlled flow path effecting horizontal flow of a received gas past said electrodes with the charging electrodes of each stage being operatively controlled separately from the charging electrodes of the other of said stages, and ducting for passing the received gas from an inlet to an outlet through the precipitator stages in succession in said controlled flow path to flow horizontally through said precipitator stages and vertically between said stages, a dust hopper located beneath each stage; and dust chutes extending from the hoppers to discharge outlets at the bottom of the vessel.

4,877,428

IONIC AIR CLEANER FOR HOMES AND MOTOR VEHICLES

Riccardo Zorloni, Via Trento Trieste, 78 - 20030 Baruccana di Seveso, Milano, Italy

Filed Dec. 7, 1988, Ser. No. 281,251
Claims priority, application Italy, Dec. 17, 1987, 23066 A/87
Int. Cl.[4] B03C *3/02*
U.S. Cl. 55—139 12 Claims



1. An environment ionic cleaner device, particularly designed for domestic and/or motor vehicle use, of the type in which ions are generated by means of a high electrostatic voltage, comprising a box housing, of substantially cylindrical shape, enclosing a double high static voltage generator, having at least an input and at least two outputs, one of said outputs being electrically coupled to at least an ionizing point assembly and the other output being coupled to at least a preset zone of said housing thereat there is applied a metallized plastics material film roll, and further including film cutting means for removing portions of said film.

4,877,429

VALVE DEVICE FOR P.S.A. OR R.P.S.A. SYSTEMS

Donald W. Hunter, 3516 Cedar La., Guntersville, Ala. 35976

Filed Mar. 6, 1989, Ser. No. 319,095
Int. Cl.[4] B01D *53/04*
U.S. Cl. 55—162 7 Claims

1. An improvement in a rapid pressure swing adsorption process for separation of a multicomponent feed gas by selectively adsorbing at least one component in an adsorption system having at least first and second adsorption beds, the improvement comprising:

a valve device positioned between said feed gas and said adsorption beds, comprising:

(a) a valve cover having front and rear walls;

(i) a pair of intake chambers in said valve cover in fluid communication with each other, each of said intake chamber having an opening through said rear wall of said valve cover;

(ii) a feed intake line into one of said intake chambers;

(iii) a pair of exhaust chambers in said valve cover, each of

said exhaust chambers having an opening through said rear wall of said cover;

(iv) a first conduit with one of its ends extending into one of said exhaust chambers and its other end being in the intake side of said first adsorption bed;

(v) a second conduit with one of its ends extending into the other of said exhaust chambers and its other end being in the intake side of said second adsorption bed;

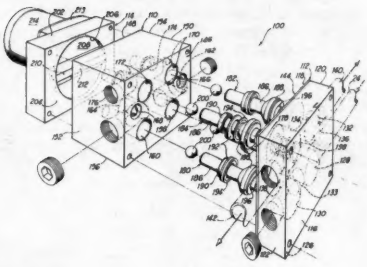
(b) a valve body having a front face and rear face, said front face being juxtaposed to said rear wall of said valve cover, said valve body having

(i) a pair of intake valve ports extending through said front and rear faces the ends of each of said intake valve ports through said front face being in registry with a respective one of said openings through said rear wall for said intake chambers;

(ii) an intake valve in each of said intake valve ports, said intake valve being normally urged into a closed position and also being movable into an open position;

(iii) a passageway interconnecting the interior of each of said intake valve ports with one of said intake chambers;

(iv) a pair of exhaust valve ports extending through said front and rear faces, the ends of each of said exhaust valve ports through said front face being in registry



with a respective one of said openings through said rear wall for said chambers;

(v) means for evacuating said interiors of said exhaust valve ports through said valve body; and

(vi) an exhaust valve in each of said exhaust valve ports, said exhaust valve being normally urged into a closed position and also being movable into an open position; and

(c) valve actuating means on said device for effecting a sequence of moving for a first predetermined amount of time a first pair of said valves consisting of one of said intake valves and one of said exhaust valves into said open position while a second pair of said valves consisting of the other of said intake valves and the other of said exhaust valves remains in said closed position, then allowing said first pair of valves to return to said closed positions while said second pair remains closed for a second predetermined amount of time, then moving said second pair of valves into said open positions while said first pair remains closed for a third predetermined amount of time and then allowing said second pair of valves to return to said closed positions while said first pair remains closed for a fourth predetermined amount of time, and repeating said sequence for a selected period of time.

4,877,430

SEPARATOR FOR GASEOUS FLUIDS

Paul Gutermuth, D-6456 Langenselbold, Fed. Rep. of Germany

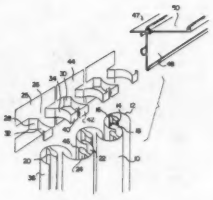
Continuation of Ser. No. 144,617, Jan. 11, 1988, abandoned. This application Aug. 18, 1988, Ser. No. 234,131

Claims priority, application Fed. Rep. of Germany, Jun. 19, 1985, 3521927; Oct. 8, 1985, 3535911

The portion of the term of this patent subsequent to May 16, 2006, has been disclaimed.

Int. Cl.[4] B01D *45/00*

U.S. Cl. 55—269 **17 Claims**



1. A separator for gaseous fluids containing solid or liquid contaminants comprising first section parts and second section parts, each of said parts being open and trough-shaped in cross section, said first parts being arranged in a first row, said second parts being arranged in a second row opposite said first row, each of said parts having free longitudinal edges, said edges of said first parts overlapping and spaced apart from said edges of said second parts said first or second section, parts being detachable from a support.

4,877,431

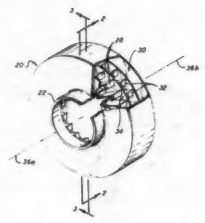
RADIAL IMPINGEMENT SEPARATOR

Leo Avondoglio, Ivoryton, Conn., assignor to Aercology Incorporated, Old Saybrook, Conn.

Filed Oct. 14, 1988, Ser. No. 257,538

Int. Cl.[4] B01D *50/00*

U.S. Cl. 55—321 **8 Claims**



1. Apparatus for removing entrained particulate from a fluid stream comprising

a housing, having an inlet port an outlet port, a plate within the housing mounted perpendicular to the centerline of the inlet port, the housing and other parts mounted therein configured to cause a fluid stream within the housing to follow a flow path which runs radially outward from the inlet across the plate, and then to the outlet; and,

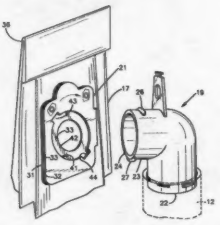
a plurality of impingement vanes within the housing mounted generally circumferentially around the inlet port on the plate or part of the housing which lies perpendicular to the inlet port centerline, so that the radially outward flowing fluid stream and entrained particulate impinges on the vanes, to cause the particulate to thereby be separated by impingement from the fluid stream.

4,877,432

DISPOSABLE DUST BAG FOR VACUUM CLEANERS AND THE LIKE

John R. Lackner, North Ridgeville, Ohio, assignor to The Scott Fetzer Company, Cleveland, Ohio

Filed Jun. 17, 1988, Ser. No. 208,735
Int. Cl.[4] B01D *46/02*
U.S. Cl. 55—375 16 Claims



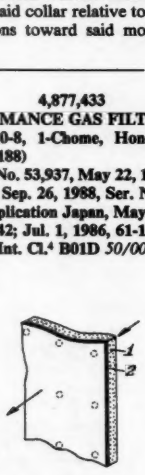
1. A vacuum cleaner providing a connector through which dirt-laden air is discharged, said connector providing a generally cylindrical wall portion having an end and peripherally spaced outwardly extending projections substantially adjacent to said end, a disposable dust bag formed of permeable sheet material defining a dust collection chamber, an inlet in said dust bag providing a substantially rigid collar having an opening therein proportioned to fit over said connector and said projections when in a mounting and removal position, said collar being rotatable relative to said connector from said mounting and removal position to an installed position in which portions of said collar engage the sides of said projections remote from said end, and an elastomeric seal around said inlet providing a generally circular opening, said seal extending past said projections from the sides thereof remote from said end to the side of said projections adjacent said end and include airtight sealing engagement with the surface of said connector on the side of said projections adjacent to said end, said seal forming an airtight seal between said dust bag and said connector when said collar is in said installed position, said seal resisting rotation of said collar relative to said connector from said installed positions toward said mounting and removal positions.

4,877,433

HIGH PERFORMANCE GAS FILTER ASSEMBLY

Yoshimi Oshitari, 10-8, 1-Chome, Hon-Cho, Tanashi City, Tokyo-To, Japan (188)

Continuation of Ser. No. 53,937, May 22, 1988, abandoned. This application Sep. 26, 1988, Ser. No. 230,275
Claims priority, application Japan, May 23, 1986, 61-117497; Jul. 1, 1986, 61-152642; Jul. 1, 1986, 61-152643
Int. Cl.[4] B01D *50/00*
U.S. Cl. 55—486 9 Claims



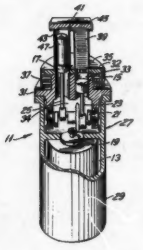
1. A high performance filter assembly comprising: a filter paper with inlet and outlet surfaces made of fibers and a fine particle checking member provided on the outlet surface of said filter paper so as to overlie each other, said fine particle checking member comprised of a thin microporous film and a breathable support member to which the thin microporous film is bonded at a plurality of spaced positions over its entire surface.

4,877,434

CRYOGENIC REFRIGERATOR

Stephen F. Malaker, Mountainside, N.J., assignor to Cryodynamics, Inc., Mountainside, N.J.

Filed Jun. 9, 1987, Ser. No. 60,034
Int. Cl.[4] F25B *9/00*
U.S. Cl. 62—6 11 Claims



1. A modified Stirling cycle cryogenic refrigerator having first piston for compressing a working gas in a first cylinder, a second piston for expanding such working gas in a second cylinder, channel means connecting said first and second cylinders, and a cold head in thermal contact with said working gas in said second cylinder, comprising:

a thin walled, hollow, evacuated extender affixed to said second piston on the face proximate said cold head for thermally isolating said second piston from the working gas in said second cylinder.

4,877,435

MECHANICALLY ALLOYED NICKEL-COBALT-CHROMIUM-IRON COMPOSITION OF MATTER AND GLASS FIBER METHOD AND APPARATUS FOP USING SAME

Ronald M. Haeberle, Jr.; Gaylord D. Smith; John H. Weber; Roneldo L. Fisher, all of Huntington, W. Va.; David J. Gaul, Granville, and Jay W. Hinze, Newark, both of Ohio, assignors to Inco Alloys International, Inc., Huntington, W. Va. and Owens-Corning Fiberglas Corporation, Toledo, Ohio

Filed Feb. 8, 1989, Ser. No. 307,485
Int. Cl.[4] C22C *19/05;* C03B *37/095;* C21D *8/00*
U.S. Cl. 65—1 43 Claims

1. A mechanically alloyed composition of matter consisting in weight percent essentially of about 30–40% chromium, about 5–25% cobalt, about 0.5–10% iron, about 0.2–0.6% aluminum, about 0.3–1.2% titanium, up to about 0.15% carbon, about 0.2–1% of yttria in a yttria-containing oxidic phase, up to about 0.7% oxygen inclusive of the oxygen in yttria, up to about 0.3% nitrogen with the proviso that the weight of said titanium is at least about 1.5 times the weight of nitrogen, up to about 0.4% zirconium, up to about 1% hafnium, up to about 1% silicon, up to about 2% manganese, up to about 0.05% boron, up to about 1% niobium, up to about 1% tantalum, up to about 1% molybdenum, up to about 1% tungsten, up to about 1% rhenium, up to about 1% total yttrium and the lanthanides provided that the total of hafnium, silicon, manganese, boron, niobium, tantalum, molybdenum, tungsten, rhenium, yttrium and the lanthanides does not exceed about 10%, the balance of the composition being essentially nickel.

16. In the method of handling material from the group of molten glass and molten slag in the presence of atmospheric oxygen, the improvement comprising employing as a handling

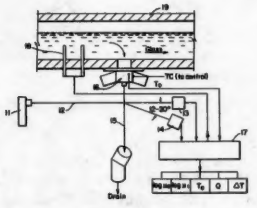
device a metallic structure composed, at least in the material contacting portion of said device, of a coarse-grained, mechanically alloyed alloy consisting in weight percent essentially of about 30–40% chromium, about 5–25% cobalt, about 0.5–10% iron, about 0.2–0.6% aluminum, about 0.3–1.2% titanium, up to about 0.15% carbon, about 0.2–1% of yttria in a yttria-containing oxidic phase, up to about 0.7% oxygen inclusive of the oxygen in yttria, up to about 0.3% nitrogen with the proviso that the weight of said titanium is at least about 1.5 times the weight of nitrogen, up to about 0.4% zirconium, up to about 1% hafnium, up to about 1% silicon, up to about 2% manganese, up to about 0.05% boron, up to about 1% niobium, up to about 1% tantalum, up to about 1% molybdenum, up to about 1% tungsten, up to about 1% rhenium, up to about 1% total yttrium and the lanthanides provided that the total of hafnium, silicon, manganese, boron, niobium, tantalum, molybdenum, tungsten, rhenium, yttrium and the lanthanides does not exceed about 10%, the balance of the composition being essentially nickel.

30. A foraminously walled glass spinner, at least the foraminous wall of which is made of a coarse-grained mechanically alloyed alloy of substantially 100% theoretical density which consists, in weight percent essentially of about 30–40% chromium, about 5–25% cobalt, about 0.5–10% iron, about 0.2–0.6% aluminum, about 0.3–1.2% titanium, up to about 0.15% carbon, about 0.2–1% of yttria in a yttria-containing oxidic phase, up to about 0.7% oxygen inclusive of the oxygen in yttria, up to about 0.3% nitrogen with the proviso that the weight of said titanium is at least about 1.5 times the weight of nitrogen, up to about 0.4% zirconium, up to about 1% hafnium, up to about 1% silicon, up to about 2% manganese, up to about 0.05% boron, up to about 1% niobium, up to about 1% tantalum, up to about 1% molybdenum, up to about 1% tungsten, up to about 1% rhenium, up to about 1% total yttrium and the lanthanides provided that the total of hafnium, silicon, manganese, boron, niobium, tantalum, molybdenum, tungsten, rhenium, yttrium and the lanthanides does not exceed about 10%, the balance of the composition being essentially nickel.

4,877,436
CONTINUOUS VISCOSITY MONITORING OF GLASS

Sheinkop Isac, 19513-M Gunners Branch Rd., Germantown, Md. 20874

Filed Mar. 13, 1989, Ser. No. 322,211
Int. Cl.[4] C03B *5/24*
U.S. Cl. 65—29 **7 Claims**

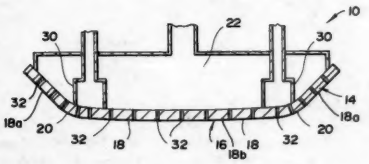


1. A method of manufacturing glass comprising:
feeding molten mineral material from a delivery means through a primary discharge bushing to a means for forming mineral fibers;
forming glass from the molten mineral material;
discharging continuously an auxiliary stream of molten mineral material from the delivery means through an auxiliary discharge outlet;
measuring continuously temperature and mass flow rate by a laser means of the auxiliary stream;
calculating viscosity of the molten mineral material using the laser measured mass flow rate; and
modifying, as needed, a process parameter in response to the measured temperature of the auxiliary stream and the calculated viscosity of the stream.

4,877,437
VACUUM PLATEN FOR SHARP BENDS

David B. Nitschke, Perrysburg, Ohio, assignor to Glasstech International L.P., Scarsdale, N.Y.

Filed Apr. 29, 1988, Ser. No. 187,837
Int. Cl.[4] C03B *23/03*
U.S. Cl. 65—287 **8 Claims**



1. Apparatus (10) for press bending a heated glass sheet (12) comprising a first bending mold (14) having a shaping surface (16); said shaping surface (16) including a first portion (18) defined by end portions (18a) and an intermediate portion (18b) extending between said end portions (18a); said shaping surface (16) also including an abruptly curved second portion (20) between each of said end portions (18a) and said intermediate portion (18b); said second portion (20) having a more abrupt curvature relative to the first portion (18); a first vacuum chamber (22) for establishing a vacuum on the first portion (18) of the shaping surface (16) and supporting the glass sheet (12) thereon during bending; a second vacuum chamber (30) located at the second portion (20) of the shaping surface (16); said second vacuum chamber (30) establishing a greater vacuum on the second portion (20) of the shaping surface (16) where the curvature of the surface (16) is most abrupt; a second bending mold (24) having a peripheral surface (26) of a complementary shape to that of the shaping surface (16); and an actuator (28) for providing relative movement between the first and second bending molds (14,24) to press bend the heated glass sheet (12).

4,877,438
MICROBIAL AND CHEMICAL CONTROL OF FRUIT RUSSETTING

Steven E. Lindow, Berkeley, Calif., assignor to The Regents of the University of California, Berkeley, Calif.

Filed Aug. 3, 1987, Ser. No. 80,707
Int. Cl.[4] A01N *63/00, 25/00*
U.S. Cl. 71—79 **6 Claims**

1. A method of reducing fruit russetting on growing fruit, which comprises:
inoculating a surface of a stone or pome fruit or an open flower from which said fruit develops with an auxin-deficient pseudomonad bacteria in an amount sufficient to reduce the population of auxin-producing bacteria on said surface.

4,877,439
HERBICIDAL 1-ARYLPYRAZOLES, COMPOSITIONS AND USE

Reinhold Gehring, Wuppertal; Otto Schallner, Monheim; Jörg Stetter, Wuppertal; Hans-Joachim Santel, Leverkusen; Robert R. Schmidt, Bergisch-Gladbach, and Harry Strang, Duesseldorf, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

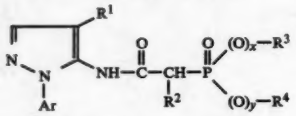
Filed Jun. 23, 1988, Ser. No. 210,607

Claims priority, application Fed. Rep. of Germany, Jul. 2, 1987, 3721868

Int. Cl.[4] A01N *57/02*; C07F *9/65*

U.S. Cl. 71—86 12 Claims

1. A 1-arylpyrazole of the formula



(I)

in which

R^1 represents hydrogen or nitro,

R^2 represents hydrogen or alkyl,

R^3 and R^4 independently of one another each represent alkyl, halogenoalkyl or optionally substituted aryl,

Ar represents optionally substituted phenyl or optionally substituted pyridyl,

x represents a number 0 or 1 and

y represents a number 0 or 1.

4,877,440
THIOPHENESULFONAMIDE HERBICIDES

Joel R. Christensen; John Cuomo, both of Newark, and George Levitt, Wilmington, all of Del., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Continuation-in-part of Ser. No. 935,504, Nov. 26, 1986, Pat. No. 4,743,290, which is a continuation-in-part of Ser. No. 852,739, Apr. 21, 1986, abandoned, which is a continuation-in-part of Ser. No. 739,074, May 29, 1985, abandoned. This application Feb. 18, 1988, Ser. No. 158,985

Int. Cl.[4] A01N *43/66*; C07D *409/12*

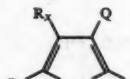
U.S. Cl. 71—90 77 Claims

1. A compound having the formula:

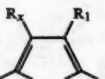
I

wherein

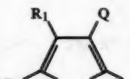
L is



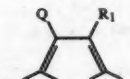
L-1



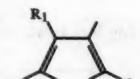
L-2



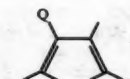
L-3



L-4

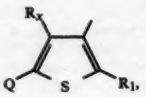


L-5

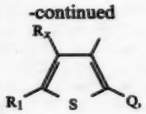


L-6

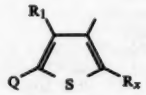
-continued



L-7

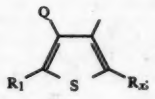


L-8



L-9

or



L-10

R is H or CH_3;

W is O or S;

R_1 is R_1' or R''_1;

R_x is H or halogen;

R_1' is H, C_1–C_3 alkyl, C_1–C_3 haloalkyl, halogen, nitro, C_1–C_3 alkoxy, CN, C_1–C_3 haloalkoxy or C_1–C_3 haloalkylthio;

R_1'' is $SO_2NR_aR_b$, C_1–c_3 alkylthio, C_1–C_3 alkylsulfinyl, C_1–C_3 alkylsulfonyl, CO_2R_c or $C(O)NR_gR_h$;

R_a is H, C_1–C_4 alkyl, C_2–C_3 cyanoalkyl, methoxy, ethoxy or C_3–C_4 alkenyl;

R_b is H or C_1–C_3 alkyl; or

R_a and R_b may be taken together to form $(CH_2)_3$, $(CH_2)_4$, $(CH_2)_5$ or $CH_2CH_2OCH_2CH_2$;

R_c is C_1–C_4 alkyl, C_3–C_4 alkenyl, C_3–C_4 alkynyl, C_2–C_4 haloalkyl, C_2–C_3 cyanoalkyl, cyclopropylmethyl or C_2–C_4 alkoxyalkyl;

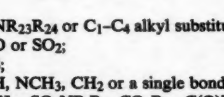
R_g is H or C_1–C_3 alkyl;

R_h is C_1–C_3 alkyl;

Q is Q_1 or Q_2;

Q_1 is ER_2, NR_3R_4,

OSO_2R_7, CN, SO_2NHR_{21},



$SO_2NR_{22}NR_{23}R_{24}$ or C_1–C_4 alkyl substituted with R_8;

E is O, S, SO or SO_2;

W_1 is O or S;

J is O, S, NH, NCH_3, CH_2 or a single bond;

Q_2 is SO_2NH_2, $SO_2NR_iR_j$, CO_2R_k, $C(O)NR_mR_n$, C_1–C_3 alkylthio, C_1–C_3 alkylsulfinyl, C_1–C_3 alkylsulfonyl, halogen, CHO or $CR_p{=}NOR_q$;

R_i is C_1–C_4 alkyl, C_2–C_3 cyanoalkyl, methoxy, ethoxy or C_3–C_4 alkenyl;

R_j is C_1–C_3 alkyl or

R_i and R_j may be taken together to form $(CH_2)_5$ or $CH_2CH_2OCH_2CH_2$;

R_k is C_1–C_4 alkyl, C_3–C_4 alkenyl, C_3–C_4 alkynyl, C_2–C_4 haloalkyl, C_2–C_3 cyanoalkyl, cyclopropylmethyl or C_2–C_4 alkoxyalkyl;

R_m is H or C_1–C_3 alkyl;

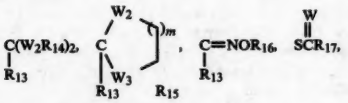
R_n is C_1–C_3 alkyl;

R_p is H, C_1–C_4 alkyl or C_1–C_4 haloalkyl;

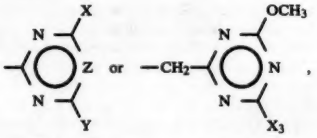
R_q is H, C_1–C_4 alkyl, C_3–C_4 alkenyl or C_3–C_4 alkynyl;

R_2 is C_1–C_6 alkyl substituted with R_8, C_2–C_6 alkenyl substi-

tuted with R_8, C_3–C_6 alkynyl, C_3–C_6 alkynyl substituted with R_8, C_1–C_6 haloalkyl, C_2–C_6 haloalkenyl or C_3–C_6 haloalkynyl;
R_3 is C_1–C_4 alkyl;
R_4 is H or C_1–C_4 alkyl; or
R_3 and R_4 may be taken together to form $(CH_2)_4$, $(CH_2)_5$ or $CH_2CH_2OCH_2CH_2$;
R_5 and R_6 are independently C_1–C_2 alkyl, C_1–C_2 alkoxy, C_1–C_2 alkylthio, C_1–C_2 alkylamino or di(C_1–C_2 alkyl)amino;
R_7 is C_1–C_4 alkyl, C_1–C_4 haloalkyl, C_3–C_4 alkenyl, C_3–C_4 haloalkenyl, C_3–C_4 alkynyl, C_3–C_4 haloalkynyl or $NR_{19}R_{20}$;
R_8 is OR_9, $S(O)_nR_{10}$, CO_2R_{10}, $SO_2NR_{11}R_{12}$, $NR_{11}R_{12}$, $CONR_{11}R_{12}$, $C(O)R_{13}$,

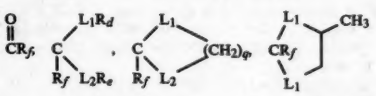


CN, SCN, SH, NO_2 or N_3;
R_9 is H, C_1–C_4 alkyl, C_3–C_4 alkenyl, C_3–C_4 alkynyl, C_1–C_4 haloalkyl, C_3–C_4 haloalkenyl, C_3–C_4 haloalkynyl, C_2–C_4 alkylcarbonyl, C_1–C_4 alkylsulfonyl, C_2–C_4 alkoxyalkyl, C_2–C_4 alkylthioalkyl or C_2–C_4 cyanoalkyl;
R_{10} is C_1–C_4 alkyl, C_3–C_4 alkenyl, C_3–C_4 alkynyl, C_1–C_4 haloalkyl, C_3–C_4 haloalkenyl, C_3–C_4 haloalkynyl, C_2–C_4 alkoxyalkyl, C_2–C_4 alkylthioalkyl or C_2–C_4 cyanoalkyl;
R_{11} is H or C_1–C_3 alkyl;
R_{12} is H, C_1–C_4 alkyl, C_1–C_4 haloalkyl, C_3–C_6 cycloalkyl, C_2–C_4 alkoxyalkyl, C_2–C_4 alkylthioalkyl, C_2–C_4 cyanoalkyl, C_1–C_3 alkoxy, C_3–C_4 alkenyl or C_3–C_4 alkynyl; or
R_{11} and R_{12} may be taken together to form $(CH_2)_3$, $(CH_2)_4$, $(CH_2)_5$ or $CH_2CH_2OCH_2CH_2$;
R_{13} is H, C_1–C_4 alkyl or C_1–C_4 haloalkyl;
R_{14} is C_1–C_2 alkyl;
R_{15} is H or CH_3;
R_{16} is H, C_1–C_4 alkyl, C_3–C_4 alkenyl or C_3–C_4 alkynyl;
R_{17} is C_1–C_4 alkyl, C_1–C_4 alkoxy, C_1–C_4 alkylthio, C_1–C_4 alkylamino or di(C_1–C_4 alkyl)amino;
R_{19} is H, C_1–C_3 alkyl, C_3–C_4 alkenyl or C_3–C_4 alkynyl;
R_{20} is H or C_1–C_3 alkyl; or
R_{19} and R_{20} may be taken together to form $(CH_2)_4$, $(CH_2)_5$ or $CH_2CH_2OCH_2CH_2$;
R_{21} is C_1–C_4 alkyl, C_1–C_3 haloalkyl, C_2–C_3 cyanoalkyl, cyclopropyl, C_3–C_4 alkenyl, C_3–C_4 alkynyl, C_2–C_4 alkoxyalkyl or C_1–C_2 alkoxy;
R_{22} is H or C_1–C_4 alkyl;
R_{23} is H or C_1–C_4 alkyl;
R_{24} is H, C_1–C_4 alkyl, C_3–C_4 alkenyl, C_3–C_4 alkynyl, C_1–C_4 haloalkyl or phenyl which may be optionally substituted with R_{25}; or
R_{23} and R_{24} may be taken together to form $(CH_2)_4$, $(CH_2)_5$ or $CH_2CH_2OCH_2CH_2$;
R_{25} is H, CH_3, Cl, F, Br, NO_2, CF_3, CH or OCH_3;
m is 1 or 2;
n is 0, 1 or 2;
W_2 and W_3 are independently O or S;
A is

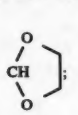


A-1 A-6

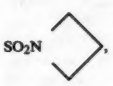
X is H, C_1–C_4 alkyl, C_1–C_4 alkoxy, C_2–C_4 haloalkoxy, C_1–C_4 haloalkyl, C_1–C_4 haloalkylthio, C_1–C_4 alkylthio, C_2–C_5 alkoxyalkyl, C_2–C_5 alkoxyalkoxy, amino, C_1–C_3 alkylamino or di(C_1–C_3 alkyl)amino;
Y is H, C_1–C_4 alkyl, C_1–C_4 alkoxy, C_2–C_4 haloalkoxy, C_1–C_4 haloalkylthio, C_1–C_4 alkylthio, C_2–C_5 alkoxyalkyl, C_2–C_5 alkoxyalkoxy, amino, C_1–C_3 alkylamino, di(C_1–C_3alkyl)amino, C_3–C_4 alkenyloxy, C_3–C_4 alkynyloxy, C_2–C_5 alkylthioalkyl, C_2–C_5 *alkylsulfinylalkyl*, C_2–C_5 alkylsulfonylalkyl, C_1–C_4 haloalkyl, C_4–C_5 cycloalkyl, C_2–C_4 alkynyl, cyano,



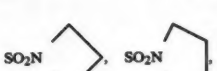
or $N(OCH_3)CH_3$;
q is 2 or 3;
L_1 and L_2 are independently O or S;
R_d and R_e are independently C_1–C_2 alkyl;
R_f is H or CH_3;
z is N;
X_3 is CH_3 or OCH_3;
and their agriculturally suitable salts; provided that
(a) when E is O or S and R_9 is H, then R_2 is other than CH_2OR_9;
(b) when W is S, then A is A-1, R is H and Y is CH_3, OCH_3, OC_2H_5, CH_2OCH_3, C_2H_5, CF_3, SCH_3, $OCH_2CH{=}CH_2$, $OCH_2C{\equiv}CH$, $OCH_2CH_2OCH_3$, $CH(OCH_3)_2$ or



(c) the total number of carbon atoms in R_1 and Q is less than or equal to 10;
(d) when Q is



then X and Y are other than SCF_2H;
(e) when R_1 is R_1' then L is L-1, L-3, L-5, L-6, L-8 or L-10;
(f) the total number of carbon atoms in R_{22}, R_{23} and R_{24} is less than or equal to 10;
(g) when R_{21} is C_1–C_4 alkyl, C_2–C_3 cyanoalkyl, C_1–C_2 alkoxy or C_3–C_4 alkenyl, then X and Y are other than SCF_2H;
(h) when Y is CN and R_1' is H, F, Cl or CH_3, then R_{21} is other than C_1–C_3 alkyl;
(i) when R_1 is R_1' then Q is Q_1;
(j) when R_1 is R_1'' then Q is Q_1 or Q_2;
(k) when Q_2 is halogen then R_x is halogen;
(l) when R_1'' is $SO_2NR_aR_b$, CO_2R_c or $C(O)NR_gR_h$ when Q is SO_2NHR_{21},



$SO_2NR_{22}NR_{23}R_{24}$, SO_2NH_2, $SO_2NR_iR_j$, CO_2R_k, $C(O)NR_mR_n$ or CHO then L is L-1, L-2, L-5 or L-6; and
(m) when Q_2 is halogen then L is L-2, L-4, L-5, L-6, L-7 or L-9.

66. A method for controlling the growth of undesired vegetation which comprises applying to the locus to be protected

an effective amount of a compound of claim 1.

4,877,441

FUNGICIDAL SUBSTITUTED CARBOXYLIC ACID DERIVATIVES

Tatsuya Mori; Tadashi Ohsumi; Shigeo Nakamura; Kiyoto Maeda; Sumio Nishida, and Hirotaka Takano, all of Hyogo, Japan, assignors to Sumitomo Chemical Company Ltd., Osaka, Japan

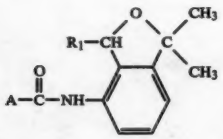
Filed Oct. 18, 1988, Ser. No. 259,283

Claims priority, application Japan, Nov. 6, 1987, 62-281563; Nov. 6, 1987, 62-281564; Nov. 6, 1987, 62-281565; Jul. 15, 1988, 63-177751; Jul. 29, 1988, 63-191919; Jul. 29, 1988, 63-191920; Aug. 2, 1988, 63-193598

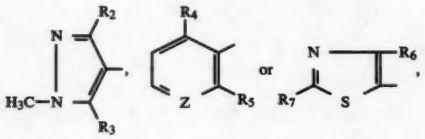
Int. Cl.[4] C07D *417/12, 405/12;* A01N *43/78, 43/56*

U.S. Cl. 71—90 12 Claims

8. An agricultural or horticultural fungicide which contains, as an active ingredient, a substituted carboxylic acid derivative having the formula:



wherein R_1 stands for a methyl or ethyl group, A stands for



R_2 stands for a methyl, ethyl or trifluoromethyl group, R_3 stands for a methyl group or a halogen or hydrogen atom, R_4 stands for a fluorine or hydrogen atom, R_5 stands for a methyl, nitro or trifluoromethyl group or a halogen atom, Z stands for an N atom, R_6 stands for a methyl, ethyl or trifluoromethyl group and R_7 stands for an amino or methyl group or a chlorine atom, with an inert carrier.

4,877,442

HERBICIDAL SULFONAMIDES

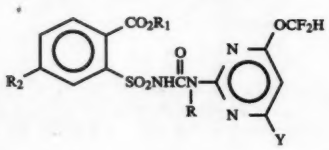
Craig L. Hillemann, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Continuation of Ser. No. 916,266, Oct. 7, 1986, abandoned, which is a continuation-in-part of Ser. No. 801,120, Nov. 22, 1985, abandoned, which is a continuation-in-part of Ser. No. 715,511, Mar. 27, 1985, abandoned, which is a continuation-in-part of Ser. No. 613,412, May 24, 1984, abandoned. This application Oct. 7, 1985, Ser. No. 257,143

Int. Cl.[4] C07D *239/69;* A01N *43/54*

U.S. Cl. 71—92 51 Claims

1. A compound of the structural formula



wherein

R is H or CH_3;

R_1 is C_1–C_3 alkyl, C_3–C_4 alkoxyalkyl, C_2–C_4 haloalkyl, C_3–C_4 alkenyl or C_3–C_4 alkynyl;

R_2 is C_1–C_3 alkyl, cyclopropyl, C_1–C_3 alkylthio, C_1–C_3 alkylsulfinyl, C_1–C_3 alkylsulfonyl, allyloxy, allylthio, allylsulfinyl, allylsulfonyl, propargyloxy, propargylthio, propargylsulfinyl, propargylsulfonyl, OCF_2H, C_2–C_3 haloalkoxy, C_1–C_3 alkyl substituted with 1–3 atoms of F or Cl, C_1–C_2 alkyl substituted with C_1–C_2 alkoxy, C_1–C_2 haloalkoxy, C_1–C_2 alkylthio, C_1–C_2 haloalkylthio, C_1–C_2 alkylsulfinyl, C_1–C_2 haloalkylsulfinyl, C_1–C_2 alkylsulfonyl, C_1–C_2 haloalkylsulfonyl, OH or $OC(O)C_1$–C_2 alkyl, C_1–C_2 alkoxy substituted with C_1–C_2 alkoxy, C_1–C_2 haloalkoxy, C_1–C_2 alkylthio, C_1–C_2 haloalkylthio, C_1–C_2 alkylsulfinyl, C_1–C_2 haloalkylsulfinyl, C_1–C_2 alkylsulfonyl, C_1–C_2 haloalkylsulfonyl or CN, $OCH_2CH_2NH_2$, $OCH_2CH_2NHCH_3$, $OCH_2CH_2N(CH_3)_2$, C_1–C_2 alkylthio substituted by C_1–C_2 alkoxy, C_1–C_2 haloalkoxy, C_1–C_2 alkylthio, C_1–C_2 haloalkylthio or CN, SCF_2H, C_2–C_3 haloalkylthio, C_1–C_3 haloalkylsulfinyl, C_1–C_3 haloalkylsulfonyl, C_2–C_3 alkenyl, NR_bR_c or $OC(O)C_1$–C_2 alkyl;

R_b is H or C_1–C_2 alkyl;

R_c is C_1–C_2 alkyl or C_1–C_2 haloalkyl;

Y is, OCH_3 and

their agriculturally suitable salts.

22. An agriculturally suitable composition for controlling the growth of undesired vegetation comprising an effective amount of a compound of claim 1 and at least one of the following: surfactant, solid or liquid diluent.

4,877,443

2,4-DIAMINO-6-TRIFLUOROMETHYLPYRIMIDINE COMPOUNDS USEFUL AS HERBICIDES

Michael Schwamborn, Cologne; Erich Klauke, Odenthal; Robert R. Schmidt, Bergisch-Gladbach; Hans-Joachim Santel, Leverkusen, and Robert H. Strang, Duesseldorf, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

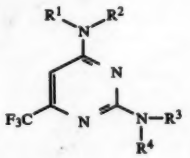
Filed Jan. 13, 1987, Ser. No. 2,881

Claims priority, application Fed. Rep. of Germany, Jan. 22, 1986, 3601800

Int. Cl.[4] C07D *239/48;* A01N *43/54*

U.S. Cl. 71—92 10 Claims

1. A 2,4-diamino-6-haloalkylpyrimidine of the formula



in which

R^1 and R^3, independently of one another, represent hydrogen or alkyl having 1–6 C atoms, and

R^2 and R^4, independently of one another, represent hydrogen, alkyl having 1–8 C atoms, which is unsubstituted or substituted by fluorine, chlorine, bromine, iodine, cyano or cyclopropyl, represent alkoxyalkyl or alkylthioalkyl, in each case having 1–6 C atoms in each alkylthio or alkoxy moiety and 2–8 C atoms in each alkyl moiety, cycloalkyl ahving 3–5 C atoms, alkenyl, having 3–6 C atoms, which is unsubstituted or substituted by halogen, or alkynyl having 3–6 C atoms, and with the provisos that (a) R^3 and R^4 do not simultaneously represent hydrogen, and (b) R^1 and R^2 do not simultaneously represent hydrogen when R^4 represents alkoxyalkyl or alkylthioalkyl.

8. A method of combating unwanted vegetation which comprises applying to such vegetation or to a locus from

which it is desired to exclude such vegetation a herbicidally effective amount of a compound according to claim 1.

4,877,444

TETRAHYDROINDAZOLYL-BENZOXAZINES AND USE

Masayuki Enomoto, Takarazuka; Eiki Nagano, Tabata; Toru Haga, Toyonaka; Kouichi Morita, Kasai, and Ryo Sato, Tabata, all of Japan, assignors to Sumitomo Chemical Company, Limited, Osaka, Japan

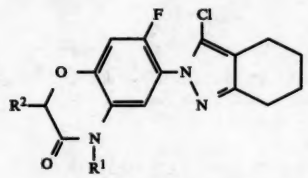
Filed Aug. 22, 1988, Ser. No. 234,619

Claims priority, application Japan, Aug. 27, 1987, 62-213946; Feb. 24, 1988, 63-042922

Int. Cl.[4] A01N *43/84*; C07D *413/04*

U.S. Cl. 71—92 **14 Claims**

1. A compound of the formula:



wherein R^1 is a C_1–C_6 alkyl group, a C_3–C_7 alkenyl group, a C_3–C_7 alkynyl group, a halo(C_1–C_5)alkyl group, a halo(C_3–C_4)alkenyl group, a halo(C_3–C_4)alkynyl group, a C_1–C_4alkoxy(C_1–C_2)alkyl group or a C_1–C_2 alkylthio(C_1–C_2)alkyl group and R^2 is a hydrogen atom or a methyl group.

13. A method for exterminating harmful weeds, which comprises applying a herbicidally effective amount of the compound according to claim 1 and an inert carrier or diluent to the area where the undesired weeds grow or will grow.

4,877,445

METHOD FOR PRODUCING A METAL FROM ITS HALIDE

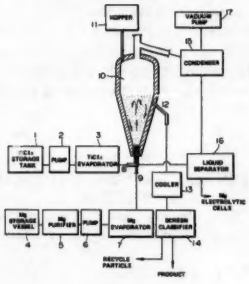
Shigenori Okudaira, Ninomiya; Takefumi Irie; Hiroshi Uchida, both of Chigasaki; Eiichi Fukasawa, Samukawa; Kazuhiko Kobayashi, Chigasaki, and Masanori Yamaguchi, Nakai, all of Japan, assignors to Toho Titanium Co., Ltd., Tokyo, Japan

Filed Jun. 30, 1988, Ser. No. 214,042

Claims priority, application Japan, Jul. 9, 1987, 62-169715

Int. Cl.[4] C22B *34/10*; C01B *33/02*

U.S. Cl. 75—0.5 B **8 Claims**



1. A method for producing a metal by the reduction of its metal halide using a reducing metal agent, characterized by the steps of: charging a reaction vessel with particles of the same metal as the metal product; injecting a gas upwards into the reaction vessel from its lower portion to cause the metal particles in the reaction vessel to form a fluidized bed of the metal particles; introducing the metal halide and reducing metal agent into the reaction vessel; and causing a reducing reaction of the metal halide with the reducing metal agent on the surface of the metal particles at a temperature below the melting point of the metal product and at a reduced pressure below the vapor pressure of each of the reducing metal agent and the metal halide at the reaction temperature.

4,877,446

PESTICIDES BASED ON PYRIMIDINE DERIVATIVES

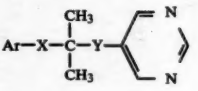
Hans-Ludwig Elbe, Wuppertal; Stefan Dutzmann, Duesseldorf, and Paul Reinecke, Leverkusen, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Filed Jan. 22, 1988, Ser. No. 146,996

Int. Cl.[4] A01N *43/54*; C07D *239/26*

U.S. Cl. 71—92 **12 Claims**

1. A method of combating fungi which comprises applying to such fungi or to a fungus habitat a fungicidally effective amount of a substituted pyrimidine of the formula

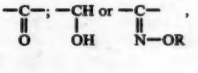


in which

Ar represents phenyl which is optionally substituted by one to three of halogen, cyano, nitro and in each case straight-chain or branched alkyl, alkoxy, alkylthio, alkylsulphinyl or alkylsulphonyl in each case having 1 to 4 carbon atoms, in each case straight-chain or branched halogenoalkyl, halogenoalkoxy, halogenoalkylthio, halogenoalkylsulphinyl or halogenoalkylsulphonyl in each case having 1 to 4 carbon atoms and 1 to 9 identical or different halogen atoms, in each case straight-chain or branched alkoxycarbonyl or alkoximinoalkyl in each case having 1 to 4 carbon atoms in the individual alkyl parts, doubly linked dioxyalkylene which is optionally monosubstituted to polysubstituted by identical or different halogen, or phenyl or phenoxy which is in each case optionally monosubstituted to polysubstituted by identical or different halogen,

x represents oxygen, sulphur, sulphinyl, sulphonyl or one of the groups $-CH_2-$; $-O-CH_2-$; $-CH_2-O-$; $-O-CH_2-CH_2-$; $-S(O)_n-CH_2-$; $-CH_2-S(O)_n-$ or $-S(O)_n-CH_2-CH_2-$, and

Y represents one of the groups



where

R represents hydrogen or in each case straight-chain or branched alkyl having 1 to 6 carbon atoms, alkenyl having 3 to 5 carbon atoms or alkinyl having 3 to 5 carbon atoms, or benzyl or phenylethyl which is in each case optionally monosubstituted to trisubstituted by identical or different substituents, suitable substituents in the phenyl part in each case being those mentioned in the case of the Ar radical, and

n represents a number 0, 1 or 2,

or an acid-addition salt or melt-salt complex thereof.

11. A compound selected from the group consisting of

1-(5-pyrimidyl)-2,2-dimethyl-3-(4-trifluoromethylthiophenyl)-propan-1-ol, and

1-(5-pyrimidinyl)-2,2-dimethyl-3-(4-trifluoromethoxyphenyl)-propan-1-ol,

or an acid-addition salt or metal-salt complex thereof.

4,877,447

METHOD AND COMPOSITION FOR INCREASING HARVESTS OF CROPS

Akinori Suzuki, Chiba; Toshio Kajita, Narashino, and Masakazu Furushima, Nagareyama, all of Japan, assignors to Mitsubishi Gas Chemical Company, Inc., Tokyo, Japan

Filed Jul. 8, 1987, Ser. No. 71,257
Claims priority, application Japan, Jul. 11, 1986, 61-161974
Int. Cl.[4] A01N *41/06*
U.S. Cl. 71—103 15 Claims

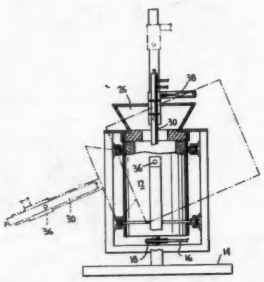
1. A method of increasing the harvest of a crop which comprises applying 50 to 10,000 g of taurine per hectare at the locus where the crop is cultivated.

4,877,448

PROCESS FOR RECOVERY OF FREE ALUMINUM FROM ALUMINUM DROSS OR ALUMINUM SCRAP USING PLASMA ENERGY

Richard D. Lindsay, Raleigh, N.C., assignor to Plasma Energy Corporation, Raleigh, N.C.

Filed Dec. 8, 1988, Ser. No. 281,049
Int. Cl.[4] C22B *21/00, 4/00*
U.S. Cl. 75—10.21 6 Claims



1. A process of recovering free aluminum from aluminum dross or aluminum scrap comprising charging aluminum dross or aluminum scrap to a furnace equipped with a plasma arc torch for heating said charge; heating said charge by providing plasma energy to said charge which plasma energy is generated by feeding air to said torch for ionization; continuing said heating until said charge is molten, and removing free aluminum in the molten state from said furnace.

4,877,449

VERTICAL SHAFT MELTING FURNACE AND METHOD OF MELTING

Mark J. Khinkis, Morton Grove, Ill., assignor to Institute of Gas Technology, Ill.

Filed Jul. 22, 1987, Ser. No. 76,491
Int. Cl.[4] C22B *9/16;* F27B *1/24;* C03B *3/00, 5/12*
U.S. Cl. 75—20 R 49 Claims

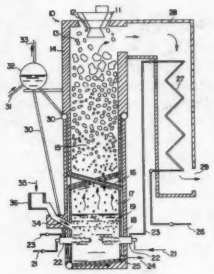
1. A process for melting solids comprising:

charging meltable solids to an upper region of a bed of said solids supported in a vertical shaft melting furnace by a support means consisting of a fluid cooled support grid having openings smaller than an average diameter of said meltable solids;

maintaining a melt pool at a bottom of said vertical shaft melting furnace;

maintaining submerged combustion in said melt pool thereby producing combustion product gases;

passing said combustion product gases of said submerged combustion upwardly through said bed of solids preheating and melting a portion of said solids forming melt which flows downwardly into said melt pool and partially melting a remaining portion of said solids reducing their



size to a sufficiently small size to pass through said support grid openings into said melt pool.

4,877,450

FORMALDEHYDE-FREE ELECTROLESS COPPER PLATING SOLUTIONS

William R. Brasch, Nesconset, N.Y., assignor to LeaRonal, Inc., Freeport, N.Y.

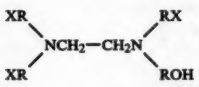
Filed Feb. 23, 1989, Ser. No. 314,537
Int. Cl.[4] C23C *3/02, 16/00*
U.S. Cl. 106—1.26 22 Claims

1. A formaldehyde-free electroless copper plating solution comprising:

a solution soluble divalent copper compound;

an amine borane reducing agent for said copper compound;

a complexing and chelating agent mixture of an amine alkanol compound having at least one alkyl group of 1 to 3 carbon atoms and an ethylene diamine compound of the formula



wherein R is an alkyl moeity having between 1 and 3 carbon atoms and X is —OH or —COOH;

said solution having a pH above about 6 but less than about 9 and a temperature above about 125° F. but below about 165° F., said complexing and chelating agent mixture being present in an amount sufficient to provide stability to the solution and to enable the solution to provide a uniform plating rate of copper upon a substrate which is immersed therein.

4,877,451

INK JET INKS CONTAINING COLORED SILICA PARTICLES

Francoise M. Winnik, Toronto, and Barkev Keoshkerian, Thornhill, both of Canada, assignors to Xerox Corporation, Stamford, Conn.

Filed Aug. 17, 1988, Ser. No. 232,967
Int. Cl.[4] C09D *11/02*
U.S. Cl. 106—23 47 Claims

1. An ink jet ink composition which comprises water; a solvent selected from the group consisting of glycols, dimethylsulfoxide, and sulfolane; and a plurality of colored particles comprising hydrophilic porous silica particles, to the surface of which dyes are covalently bonded through silane coupling agents.

4,877,452

COMPOUND CEMENT, MORE PARTICULARLY USABLE IN BORE HOLES

Michel Roussel, Paris, and Daniel Baffreau, St Maur Les Fosses, both of France, assignors to Entreprise Gagneraud Pere & Fils and Total Compagnie Francaise des Petroles, both of Tokyo, Japan

Filed Apr. 28, 1988, Ser. No. 187,542
Claims priority, application France, May 14, 1987, 87 06774
Int. Cl.[4] C04B 7/02, 7/14
U.S. Cl. 106—97 4 Claims

1. A cementitious composition for bore holes consisting essentially of (1) a first component consisting essentially of from 50% to 90% of a ground blast-furnace slag with a vitrification rate of 90 to 100% and (2) a second component consisting essentially of from 50% to 10% of a Portland cement, said Portland cement consisting essentially of from 0 to 6% magnesium oxide, from 0 to 3% sufur trioxide, from 0 to 3% tricalcium aluminate, an insoluble residue of from 0 to 0.75%, from 48 to 65% tricalcium silicate, and a total amount formed by the amount of tetracalcium aluminoferrite plus the amount of dicalcium ferrite plus two times the amount of tricalcium aluminate of up to 24%, the mesh size of said components being substantially similar, in the range of from 2800 to 3000 cm^2/g.

4,877,453

PROCESS OF PRETREATING A POZZOLANIC MATERIAL FOR INCREASING THE POZZOLANIC PROPERTIES OF SAID MATERIAL

Hendrik Loggers, Amerongen, Netherlands, assignor to Aardelite Holding B.V., Nunspeet, Netherlands

Continuation of Ser. No. 83,978, Aug. 11, 1987, Pat. No. 4,770,709, which is a continuation of Ser. No. 853,458, Apr. 18, 1986, abandoned. This application Sep. 12, 1988, Ser. No. 243,502
Claims priority, application Netherlands, Apr. 18, 1985, 8501137
The portion of the term of this patent subsequent to Sep. 13, 2005, has been disclaimed.
Int. Cl.[4] C04B 7/34
U.S. Cl. 106—118 8 Claims

1. A process of preparing a mixture for forming articles to be cured, by mixing a pozzolanic material, including fly ash, water, and one of calcium oxide and calcium hydroxide, wherein at least sufficient additional heat is or has been added at the time of the action of water upon a mixture of pozzolanic material and one of calcium oxide and calcium hydroxide so that the resulting mixture has or immediately thereafter attains a temperature of 50 deg. C. to 80 deg. C.

4,877,454

MODEL HUMAN SKIN

John C. Charkoudian, Newton, Mass., assignor to The Kendall Company, Boston, Mass.

Filed Feb. 4, 1988, Ser. No. 152,212
Int. Cl.[4] C08L 89/04
U.S. Cl. 106—131 10 Claims

1. A model skin substrate adapted for screening testing of adhesion of adhesives to human skin, said model skin substrate being characterized as being water-swellable and water-insoluble, said substrate being further characterized in that the major surface thereof for testing possesses human skin topography, said substrate consisting essentially of:

(1) water in an adjustable amount ranging from about 8 percent to about 45 percent by weight based upon the total weight of said substrate;

(2) water-soluble proteinaceous material which has been crosslinked to render it water-insoluble and water-swellable; and

(3) di- or triglyceridic ester of a C_{12} or greater fatty acid, said proteinaceous material and glyceridic ester being the remaining percentage of essential material in said substrate, the ratio by weight of proteinaceous material to glyceridic ester being from about 2:1 to about 4:1.

4,877,455

COATINGS UTILIZING GRAFT POLYOLS

Melvin Brauer, East Brunswick, and Dominic Simone, Lincroft, both of N.J., assignors to CasoChem, Inc., Bayonne, N.J.

Continuation-in-part of Ser. No. 680,705, Dec. 12, 1984, Pat. No. 4,640,801, which is a continuation-in-part of Ser. No. 581,816, Feb. 21, 1984, abandoned. This application Jan. 30, 1987, Ser. No. 8,720
Int. Cl.[4] C08F 242/00
U.S. Cl. 106—244 58 Claims

1. A coating composition comprising: a polyol component comprising the liquid reaction product of:

(a) at least one unsaturated fatty carbon compound having at least 8 carbon atoms, at least one hydroxyl group, and at least one ethylenic double bond, said compound having other than terminal unsaturation;

(b) at least one liquid cyclopentadienyl compound; and

(c) at least one terminally unsaturated monomer or compound having at least one hydroxyl group; and

a curing agent comprising an isocyanate compound or an aminoplast resin.

4,877,456

ANTIOXIDANT WAX FOR RUBBER

Kaoru Chikamune; Manabu Tokuda, both of Tokuyama; Kazuo Inoue, Nagaokakyo; Kyoshi Utsunomiya, and Yoshii Hitofude, both of Tokuyama, all of Japan, assignors to Nippon Seiro Company, Limited, Tokyo, Japan

Filed Nov. 30, 1988, Ser. No. 277,828
Claims priority, application Japan, Nov. 30, 1987, 62-300050; Oct. 28, 1988, 63-270723
Int. Cl.[4] C08L 91/06; C08H 3/00
U.S. Cl. 106—270 1 Claim

1. An antioxidant wax characterized in that the content of normal saturated hydrocarbon is at least 75%, which contains the normal saturated hydrocarbon having a carbon number of 36 to 51 in from 20 to 45% and the normal saturated hydrocarbon having a carbon number of 21 to 26 in from 5 to 25% respectively.

4,877,457

CATIONIC AQUEOUS BITUMINOUS EMULSION-AGGREGATE SLURRIES PREPARATION

Peter Schilling, and Hans G. Schreuders, both of Charleston, S.C., assignors to Westvaco Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 197,100, May 20, 1988, Pat. No. 4,810,299. This application Oct. 27, 1988, Ser. No. 263,440
Int. Cl.[4] C08L 95/00; C09D 3/24, 3/20
U.S. Cl. 106—277 5 Claims

1. A method of forming a bituminous emulsion at a temperature above 100° F. comprising

(1) from about 30% to about 80% by weight of bitumen,

(2) from about 0.1% to about 10% by weight of an emulsifier obtained by reacting a sugar-containing syrup with a modified polyamine prepared by reacting a polyamine with a member selected from the group consisting of fatty acids, animal fats, vegetable oils, tall oil, reaction products of tall oil fatty acids with a member of the group consisting of acrylic acid, methacrylic acid, fumaric acid, maleic anhydride, sulfonated fatty acid, sulfonated resin acids, and reaction products of resin acids with a member of the group consisting of acrylic acid, fumaric acid, and maleic anhydride, epoxidized fats, vegetable oils, and fatty acid esters, and

(3) water to make up 100% by weight.

4,877,458

CONTINUOUS AUTOMATIC SNOW AND ICE PREVENTION AND CLEARING OF AUTOMOBILE FRONT AND REAR WINDOWS

Moshe Trop, Brooklyn, N.Y., assignor to Morton Weintraub, Brooklyn, N.Y.

Filed Nov. 30, 1987, Ser. No. 126,469
Int. Cl.[4] B08B 7/04
U.S. Cl. 134—5 25 Claims

1. A method for clearing an accumulation of snow and ice upon a window of an automobile when said automobile is in operation and when said automobile is not in operation, the steps comprising, attaching to said automobile in proximity of said window a container having means for allowing contact of said falling snow and ice with solid hygroscopic material contained in said container such that when said snow and said ice comes into said contact with said hygroscopic material, said snow and ice dissolves a quantity of said hygroscopic material, said dissolved material flows onto said window via means for allowing said flow of said material comprising a solution of said hygroscopic material and melted said snow and ice, thereby providing said clearing of said accumulation in accordance with said flow by melting said accumulation of snow and ice when said automobile is in operation and when said automobile is not in operation.

4,877,459

FLOOR CLEANING COMPOSITIONS AND THEIR USE

John R. Cockrell, Jr., Greensboro, and Joseph T. Thekkekandam, Siler City, both of N.C., assignors to Kay Chemical Company, Greensboro, N.C.

Division of Ser. No. 763,733, Aug. 8, 1985, Pat. No. 4,749,508, and a continuation-in-part of Ser. No. 698,468, Feb. 5, 1985, abandoned. This application Sep. 4, 1987, Ser. No. 78,774
Int. Cl.[4] B08B 30/00; C11D 3/04
U.S. Cl. 134—40 54 Claims

24. The method according to claim 20, wherein the stripper comprises:

(a) 4–20 parts citric acid;
(b) 0.7–3 parts phosphoric acid;
(c) 8–32 parts buffering salt of a weak acid;
(d) 2–9 parts hydrotrope;
(e) 1–15 parts surfactant;
(f) 1–8 parts filler;
(g) 0.6–3 parts neutralizer; and
(h) 0.8–3.5 parts foam stabilizer.

53. The method according to claim 50, wherein the aqueous solution comprises:

(a) 5 to 30 parts of citric acid;
(b) 0.1 to 10 parts of sulfamic and/or phosphoric acid;
(c) 2 to 50 parts of monosodium phosphate and/or sodium acid pyrophosphate;
(d) 0 to 10 parts of hydrotrope;
(e) 5 to 40 parts of nonionic and/or anionic surfactant;
(f) 0 to 10 parts of fumed silica;
(g) 0 to 15 parts of sodium tripolyphosphate; and
(h) 0 to 50 parts of filler.

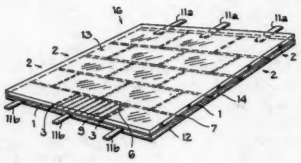
4,877,460

SOLAR CELL MODULE

Helmut Flödl, Bad Friedrichshall, Fed. Rep. of Germany, assignor to Telefunken electronic GmbH, Heilbronn, Fed. Rep. of Germany

Filed Mar. 4, 1988, Ser. No. 164,464
Claims priority, application Fed. Rep. of Germany, Mar. 17, 1987, 3708548
Int. Cl.[4] H02N 6/00
U.S. Cl. 136—244 7 Claims

1. In a solar cell module comprising a plurality of rows of solar cells with adjacent ones of said solar cell rows being arranged with an overlap, and being electrically interconnected in the overlap zone, and with each solar cell row including at least two solar cells and having the butt joints created by the alignment of the solar cells in a solar cell row offset relative to those in adjacent said solar cell rows; the improvement wherein: each of said solar cells has a rectangular configuration and is provided on its front surface with a conductive contact bridge which extends parallel to and along one entire edge; the overlap zones on said front surfaces in the region of said contact bridges and the overlap zones on the diametrally



opposed edges of the rear surfaces, extend over the entire length of a respective solar cell row and make direct contact with the aligned said solar cells in a respective solar cell row as well as with the successive said solar cell rows so that the aligned solar cells of a solar cell row are connected in parallel and the aligned solar cell rows are connected in series; and said solar cell rows are soldered together at the contacts in the overlap zones.

4,877,461

NICKEL-BASE ALLOY

Gaylord D. Smith; Curtis S. Tassen; Pasupathy Ganesan, all of Huntington, and Jack M. Wheeler, Lesage, all of W. Va., assignors to Inco Alloys International, Inc., Huntington, W. Va.

Filed Sep. 9, 1988, Ser. No. 242,732
Int. Cl.[4] C22F 1/10
U.S. Cl. 148—11.5 N 16 Claims

7. A process for enhancing the stress-rupture strength of the alloy set forth in claim 1 such that it is characterized by a life in excess of 20 hours under a stress of 11,000 psi and a temperature of 1700° F. (927° C.), said process being comprised of a combination of cold rolling and thermal treatment in which the alloy is first cold reduced from 10% up to less than 60% and thereafter annealed at a temperature of 1850° to 2125° F. (1010°–1163° C.) for a period to provide a substantially recrystallized microstructure with an average grain size of about ASTM #3 to ASTM #5, and such that M_6C carbide is formed and constitutes at least 1% by weight of the alloy.

4,877,462

PROCESS FOR PRODUCING OIL QUENCH HARDENING AND TEMPERING AND HARD DRAWN STEEL WIRE OF SHAPED SECTION

Heiji Sugita, Tokyo, Japan, assignor to Sugita Wire Mfg. Co., Ltd., Tokyo, Japan

Filed Jul. 7, 1988, Ser. No. 217,494
Claims priority, application Japan, Jul. 10, 1987, 62-172372
Int. Cl.[4] C22C 8/06
U.S. Cl. 148—12 B 8 Claims

1. A process for producing an oil tempered and hard drawn steel wire for springs having a shaped cross section free of twist in the longitudinal direction, which comprises descaling, annealing and descaling again a hot rolled wire rod, cold work-

ing the wire rod, oil tempering the cold worked wire, descaling the oil tempered wire, and giving the wire a shaped cross section free of twist in the longitudinal direction by cold working the treated wire.

4,877,463

METHOD FOR PRODUCING ROLLED STEEL PRODUCTS, PARTICULARLY THREADED STEEL TENSION MEMBERS

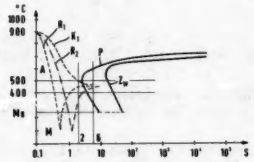
Max Aicher, Freilassing; Dieter Jungwirth, Munich; Hans-Wilhelm Klein, Mitterfelden, and Dieter Russwurm, Puchheim, all of Fed. Rep. of Germany, assignors to Dyckerhoff & Widmann Aktiengesellschaft, Munich, Fed. Rep. of Germany

Continuation of Ser. No. 86,215, Aug. 13, 1987, abandoned, which is a continuation of Ser. No. 769,156, Aug. 23, 1985, abandoned. This application Jun. 7, 1988, Ser. No. 205,556

Claims priority, application Fed. Rep. of Germany, Aug. 23, 1984, 3431008

Int. Cl.[4] C21D *9/52*

U.S. Cl. 148—12 B 5 Claims



1. A method of producing an axially extending rolled steel member for use as prestressing steel member and having a generally circular transverse section with an axially extending core zone (K) enclosed by an axially extending annular rim zone (R) and comprising the steps of forming the steel member with a C content in the range of 0.50 to 0.80%, a Si content in the range of 0.20 to 0.50%, a Mn content in the range of 0.30 to 0.80%, hot rolling the steel member in a rolling mill with a finishing stand having an outlet, removing the rolled member from the outlet of the finishing stand at the final rolling temperature and selecting the final rolling temperature in the range of 860° to 1060° C., surface quenching in a single operation the rolled member at the rolling temperature from the finishing stand using a cooling medium so that the rim zone (R) is transformed immediately into martensite while maintaining the heat content in the core zone (K) so that the heat content does not temper the martensite rim zone during subsequent cooling beyond the range of the intermediate stage, and surface quenching and tempering the steel member so that the surface temperature of the rim zone, depending on the diameter of the steel product, is in the range of 400° and 500° C. in the time interval between the second and sixth second following the commencement of surface quenching.

4,877,464

RAPID MAGNETIC ANNEALING OF AMORPHOUS METAL IN MOLTEN TIN

John Silgailis, Cedar Grove; Davidson Nathasingh, Stanhope, and Christopher A. Bruckner, Madison, all of N.J., assignors to Allied-Signal Inc., Morris Township, N.J.

Continuation of Ser. No. 871,955, Jun. 9, 1986, Pat. No. 4,668,309. This application Apr. 2, 1987, Ser. No. 33,981

The portion of the term of this patent subsequent to May 26, 2004, has been disclaimed.

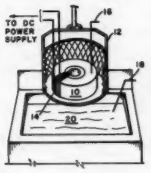
Int. Cl.[4] C21D *1/04*

U.S. Cl. 148—108 16 Claims

1. A method for rapid magnetic annealing of an amorphous metal alloy alloy comprising the steps of

(a) applying a magnetic field to the alloy,

(b) immersing the alloy in a liquid comprising molten tin, whose temperature is in the range between about 0.6 T_g and 1.0 T_g, where T_g is the glass transition temperature of the alloy in degrees C.,



(c) separating the alloy from the liquid, and

(d) immersing the alloy in a cooling fluid.

4,877,465

STRUCTURAL PARTS OF AUSTENITIC NICKEL-CHROMIUM-IRON ALLOY

Jean R. Donati, Thomery; Daniele Guttmann, Samois sur Seine; Yves Rouillon, Avon; Pierre S. Paul, Samois sur Seine, and Guy Zacharie, Fontainebleau, all of France, assignors to Electricite de France (Service National), France

Filed Mar. 17, 1987, Ser. No. 26,514

Claims priority, application France, Mar. 18, 1986, 86 03832

Int. Cl.[4] C22C *19/05*; C22F *1/10*

U.S. Cl. 148—428 8 Claims

1. Structural part for use in contact with high temperature high pressure water in a nuclear reactor, of stainless austenitic nickel base alloy containing, by weight, from 5 to 10% of iron, from 18 to 20% of chromium and more than 60% of nickel, the total amount of iron, chromium and nickel representing less than 100% of the alloy, wherein said alloy has been subjected to a homogenization and hardening heat treatment recommended for X750 alloys comprising homogenization at 1093° C. for one hour and subsequent hardening at 704° C. for 20 hours; and wherein said alloy has a yield limit of at least 700 MPa and the contents of all constituents of the alloy, except chromium, are in the standard ranges corresponding to X750 alloys.

4,877,466

PERCUSSION-SENSITIVE THERMOSTABLE PYROTECHNIC COMPOUND

Gérard Dassé, Tarbes, France, assignor to Etat Francais as represented by the Delegue general pour l'armement, France

Filed Dec. 30, 1988, Ser. No. 292,247

Claims priority, application France, Dec. 3, 1987, 87 16762

Int. Cl.[4] D03D *23/00*

U.S. Cl. 149—108.6 5 Claims

1. Pyrotechnic compound that is stable at temperatures of the order of 100° C., percussion-sensitive, having an initiation power, wherein it includes a mixture of a primary explosive consisting of silver nitride and a powder of selenium, tellurium and/or sulfur.

4,877,467

ELECTRICALLY INSULATED WIRE

Eric P. Marsden, and John A. Checkland, both of Pointe Claire, Canada, assignors to Northern Telecom Limited, Ottawa, Canada

Continuation of Ser. No. 263,610, May 14, 1981, abandoned, which is a continuation of Ser. No. 105,590, Dec. 20, 1979, abandoned, which is a continuation-in-part of Ser. No. 910,644, May 30, 1978, abandoned. This application Nov. 20, 1985, Ser. No. 799,983

Claims priority, application Canada, May 26, 1978, 304201

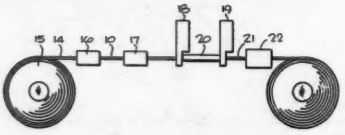
Int. Cl.[4] B05D *3/06, 5/12*; H01B *13/00*

U.S. Cl. 156—51 2 Claims

1. A method of making an electrically insulatd wire in which

a conductor is covered with a first layer of non-crosslinked and non-crosslinkable polymeric material comprising:

feeding the conductor with its first layer through an extruder to form a skin layer of crosslinkable polymeric material, compatible with the first layer, around the first layer, and irradiating the skin layer to crosslink it,



wherein the first layer is extruded onto the conductor before the extrusion of the skin layer.

wherein the first layer is a non-crosslinkable polyvinylchloride composition and the skin layer is extruded as an irradiation of crosslinkable composition.

4,877,468

HOT TIRE FORMING METHOD

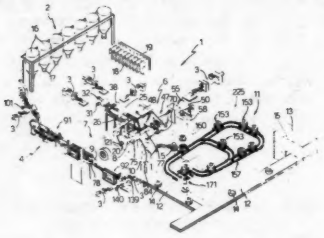
Karl J. Siegenthaler, Rome, Italy, assignor to The Firestone Tire & Rubber Company, Akron, Ohio

Filed May 18, 1987, Ser. No. 51,436

Claims priority, application Italy, May 20, 1986, 67 413-A/86

Int. Cl.[4] B29C *35/02*; B60C *9/00*

U.S. Cl. 156—111 **15 Claims**



1. A method of hot-forming tires including a number of component elements, each of said component elements being formed at least partially from a respective final mix of nonprecured elastomeric material, said component elements defining an internal carcass and an external annular package assembled together in a green tire assembly department including at least one tire building drum, said carcass comprising an impermeable inner layer and at least one outer body ply, and said external annular package comprising a number of superimposed tread plies and an outer tread wherein the method includes the steps of:

(a) producing final mixes of elastomeric material at a temperature greater than room temperature so that each said mix will absorb thermal energy, wherein at least one of said final mixes is obtained by mixing respective masterbatches with respective chemical components within respective mixers, said mixing including the transfer of thermal energy to at least one final mix to impart a temperature to said at least one final mix, at the output of said mixer, which is greater than room temperature;

(b) feeding each said a least one final mix for the continuous production of a continuous strip prior to dissipation of the thermal energy which is imparted to each at least one final mix during step (a);

(c) forming at least some of said elements by cutting semifinished products, each in the form of respective continuous strips produced by direct continuous production of the respective final mixes of step (b), said direct continuous production involving a given transfer of thermal energy to each of said continuous strips and conferring to each of said strips an output temperature greater than room temperature;

(d) hot-feeding at least some of the directly produced and cut continuous strips directly onto said one tire building drum for assembling a finished green tire on said drum, wherein said hot-feeding of at least some of said produced and cut continuous strips preserves at least part of the thermal energy imparted to said produced and cut continuous strips during said producing step and said forming step, so that each of said cut continuous strips are maintained at a total final temperature greater than room temperature;

(e) subjecting each finished green tire to a curing operation prior to dissipation of the thermal energy imparted to said continuous strips during said forming step, and prior to dissipation of the thermal energy imparted to said mixes during said producing step.

4,877,469

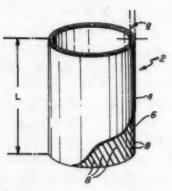
REINFORCED TIRE CURING BLADDER AND METHOD FOR USING SAME

Walter Szyms, Branford, and Joseph W. Valaitis, Guilford, both of Conn., assignors to The Armstrong Rubber Company, New Haven, Conn.

Continuation of Ser. No. 27,448, Mar. 18, 1987, abandoned. This application Aug. 10, 1988, Ser. No. 230,735

Int. Cl.[4] B29D *23/00*; *30/08*

U.S. Cl. 156—123 **11 Claims**



1. In a method of shaping and curing a tire wherein the carcass of the tire to be cured is supported in a mold, a tire curing membrane bladder is inflated within said carcass to hold the latter in place against the walls of said mold, and heat is applied to said carcass to cure the same, the improvement which comprises employing as the tire curing bladder, a bladder which, in the uninflated condition, comprises a cylindrical membrane of rubber having embedded therein a layer of reinforcing material comprising a plurality of cords traversing parallel spiral paths within said cylinder of rubber and which, in the inflated condition within said carcass, assumes a toroidal cross-sectional profile wherein said cords are aligned substantially in the direction of the longitudinal axis of said bladder.

4,877,470

METHOD FOR THE PRODUCTION OF BIAS FABRICS

Ronald G. Krueger, Sparks, Nev., assignor to J B Group, Inc., Greenwich, Conn.

Filed Oct. 23, 1986, Ser. No. 922,344

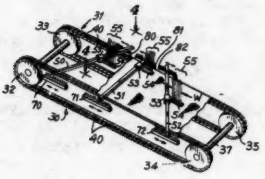
The portion of the term of this patent subsequent to Dec. 3, 2002, has been disclaimed.

Int. Cl.[4] D04H *3/00*

U.S. Cl. 156—177 **10 Claims**

1. In a method for forming a bias-laid, non-woven fabric employing a pair of movable, parallel conveyors, said conveyors lying parallel to the long axis of the fabric being formed, and at the extremities of the short axis, each of said conveyors

being provided with a first series of needles, said first needles being aimed away from the fabric being formed, comprising: providing at least two yarn carriers which lay a plurality of yarns, the yarns from each carrier lying essentially parallel to other yarns from said carrier, from a first conveyor to a second conveyor and, subsequently, from said second conveyor to said first conveyor, the yarns from the second carrier lying at a predetermined angle to those from the first carrier providing means to vertically depress said yarn carrier at a point outside of each said conveyor providing a first driving means for said yarn carrier, said second driving means providing for a reduction in the speed of movement of said yarn carrier at the extremities of travel, the improvement comprising: providing



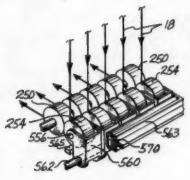
two rake means for each yarn carrier, one rake means being placed adjacent, but beyond said first conveyor, and within the extremities of travel of said yarn carriers; and said second rake means being placed adjacent, but beyond said second conveyor, and within the extremities of travel of said yarn carriers; each said rake means being provided with a second series of needles, said second series of needles being aimed toward said fabric being formed, whereby said yarns from said yarn carrier are first wrapped about or impaled on said second series of needles and, on return of said yarn carrier from said first conveyor to said second conveyor and from said second conveyor to said first conveyor, said yarns are removed from said second series of needles and wrapped about or impaled on said first series of needles.

4,877,471

METHOD AND APPARATUS FOR DELIVERING A RESIN-IMPREGNATED, MULTIFILAMENT BAND

Peter D. McCowin, Federal Way, Wash., and Brent R. Meredith, Fullerton, Calif., assignors to The Boeing Company, Seattle, Wash.

Filed Aug. 24, 1984, Ser. No. 643,772
Int. Cl.[4] B32B *27/02*
U.S. Cl. 156—181 **42 Claims**



1. A method for delivering a multifilament band comprising the steps of:

(a) providing a plurality of rovings, each roving being comprised of a bundle of resin impregnated filaments;

(b) compacting each roving to a predetermined width, said compacting step including the steps of:

(i) providing a plurality of cylindrical compaction backup rollers, each compaction backup roller being mounted for rotation about a shaft;

(ii) guiding each of said provided rovings past the radial face of one of said compaction backup rollers;

(iii) providing a plurality of compaction rollers, each compaction roller being mounted for rotation about an axially aligned shaft; and

(iv) applying a predetermined, individually adjustable force to each compaction roller such that the radial face thereof engages the roving guided past the radial face of one of said compaction backup rollers such that said roving is compacted between said radial faces to said predetermined width; and

(c) guiding said compacted rovings to a side-by-side alignment such that a band of aligned rovings is formed.

20. Apparatus for delivering a multifilament band comprising:

compaction means for compacting each of a plurality of rovings to a predetermined width, with each roving being comprised of a bundle of resin impregnated filaments, said compaction means comprising:

a plurality of cylindrical compaction backup rollers;

a plurality of cylindrical compaction rollers, each compaction roller being predeterminedly aligned with one of said compaction backup rollers;

actuating means for controlling individually displacing said compaction rollers such that the radial faces thereof moves with a predetermined compacting force in a direction to engage the radial faces of said compaction backup rollers; and

input guide means for guiding each of said plurality of rovings to said compaction means; said input guide means including guides for routing each roving past the radial face of one of said compaction backup rollers, such that upon said actuating means displacing said compaction rollers, each roving is compacted between one of said compaction rollers and one of said backup compaction rollers to said predetermined width; and

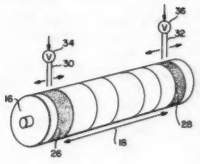
output guide means for guiding said compacted rovings to a side-by-side alignment such that a band of aligned rovings is formed.

4,877,472

METHOD OF MAKING A BEARING BLANKET

José J. A. Rodal, Clarks Summit, Pa., assignor to Beloit Corporation, Beloit, Wis.

Filed Oct. 31, 1988, Ser. No. 265,080
Int. Cl.[4] B37B *31/00*; D21F *3/02*
U.S. Cl. 156—184 **20 Claims**



1. A method of making a bearing blanket for an extended nip press, said method comprising steps of:

wrapping a reinforcing mat with uncured elastomeric polymer around a mandrel such that a central portion of the resultant blanket includes both the reinforcing mat and the elastomeric polymer, while a first and second lateral edge of the blanket includes only elastomeric polymer;

curing the elastomeric polymer;

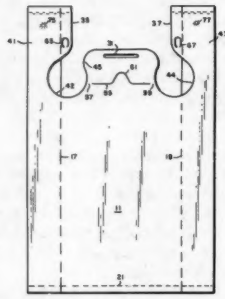
removing the resultant blanket from the mandrel; and

folding the first and second edges of the blanket radially inwardly so that the edges inhibit the escape of lubricating oil from the extended nip press past the blanket.

4,877,473
METHOD OF MAKING A BAG PACK

Michael Snowdon, East Providence, R.I., and Jay Shapiro, Sandwich, Mass., assignors to Beresford Packaging, Inc., Taunton, Mass.

Filed Feb. 16, 1988, Ser. No. 156,339
Int. Cl.[4] B32B *31/18, 31/20*
U.S. Cl. 156—204 5 Claims

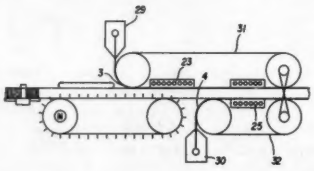


1. The method of forming a bag pack comprising:
forming a flattened gusseted tube of thermoplastic film;
heat sealing and cutting said tube along transverse lines at periodic intervals thereby to form enclosures;
stacking a plurality of said enclosures;
at one end of the enclosures in the stack, cutting out a central portion thereof overlapping the gusset regions thereby to form from each enclosure a bag having front and back walls defining an article receiving opening with loop handles at each side of the opening;
aperturing said handles intermediate said article receiving openings and the distal ends of said handles for receiving spaced support rods for holding the pack for dispensing; and
applying pressure locally without heat at a point intermediate said support rod receiving aperture and the distal end of the handle thereby to form a frangible pressure bond linking the film layers forming each of said handles.

4,877,474
PROCESS FOR THE PRODUCTION OF A HOLLOW CHAMBER PLATE OF SYNTHETIC MATERIAL

Heinz Gross, Muehltal, Fed. Rep. of Germany, assignor to Rohm GmbH Chemische Fabrik, Darmstadt, Fed. Rep. of Germany

Continuation of Ser. No. 884,799, Jul. 11, 1986, abandoned. This application Mar. 25, 1988, Ser. No. 172,934
Claims priority, application Fed. Rep. of Germany, Jul. 26, 1985, 3526752
Int. Cl.[4] B32B *3/12*
U.S. Cl. 156—244.13 4 Claims

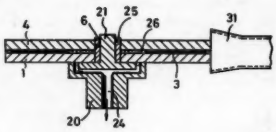


1. A process for the production of a hollow chamber plate of synthetic material, comprising the steps of:
(i) continuously supplying a plurality of prefabricated webs at a temperature below their softening point,
(ii) extruding a first cover layer in a thermoplastic condition onto a continuous belt heated to the melting temperature of said first cover layer and contact said webs and said first extruded cover layer, wherein when contacted, said first extruded cover layer is in a thermoplastic condition and said webs are at a temperature below their softening point,
(iii) cooling said contacted first extruded cover layer to below its softening temperature by cooling said continuous belt and indirectly said first cover layer,
(iv) extruding a second cover layer in a thermoplastic condition onto a continuous belt heated to the melting temperature of said second cover layer and contacting said web and said second extruded cover layer, wherein when contacted, said second extruded cover layer is in a thermoplastic condition and said webs are at a temperature below their softening point, and
(v) cooling said contacted second extruded cover layer to below its softening temperature by cooling said continuous belt and indirectly said second cover layer.

4,877,475
METHOD FOR PRODUCING INFORMATION STORAGE DISK

Masami Uchida, Hirakata, and Seiko Minamide, Nara, both of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Kadoma, Japan

Division of Ser. No. 856,286, Apr. 28, 1986, abandoned. This application Dec. 18, 1987, Ser. No. 135,539
Claims priority, application Japan, Nov. 1, 1984, 59-230704; Dec. 11, 1984, 59-261141; Dec. 11, 1984, 59-261142
Int. Cl.[4] B32B *31/28*
U.S. Cl. 156—273.7 8 Claims



1. A method for making information storage disk, comprising the steps of:
applying viscose adhesive on a first disk having a center hole, at a part near said center hole,
placing a second disk having a center hole corresponding to said center hole of said first disk on said first disk, to form an assembled disk, in which a face of said first disk confronts a face of said second disk,
temporarily mounting said assembled disk on rotating means, temporarily inserting a center boss of said rotating means in both said center holes,
while releasably holding only said first disk, revolving said assembled disk around an axis of said center boss by said rotating means to spread said viscose adhesive to all parts of said confronting faces, and
revolving said assembled disk around said axis of said center boss by said rotating means, while hardening said adhesive while maintaining said assembled disk temporarily mounted on said center boss.

4,877,476
PROCESS OF MAKING A RESIN-COMPOSITE PANEL

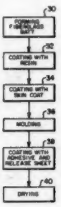
Jerry M. Wolf, Westerville, Ohio, assignor to Midwest Acoust-A-Fiber, Inc., Ostrander, Ohio

Filed Nov. 4, 1988, Ser. No. 267,281
Int. Cl.[4] B32B *31/20*
U.S. Cl. 156—307.3 11 Claims

1. A method of making an air conditioning frame having an insulating article thereon, comprising
coating a resin impregnated, partially cured fiberglass batt on a first surface with a layer of compatible resin;

applying a porous non-woven polymeric sheet onto the coated resin layer to form an article;

forming and curing the article at elevated temperature and pressure wherein the polymeric sheet melts and forms a non-porous coating on the first surface of the cured article;



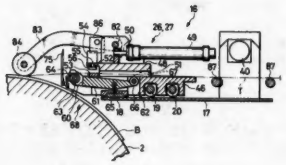
coating a layer of effective adhesive on the first surface having the non-porous coating;

bonding the article in a desired location to an air conditioning frame.

4,877,477
STRIP SUPPLYING DEVICE

Toshinori Yabe, and Kazuo Ozaki, both of Tokyo, Japan, assignors to Bridgestone Corporation, Tokyo, Japan

Filed Oct. 23, 1987, Ser. No. 111,734
Claims priority, application Japan, Oct. 23, 1986, 61-252687
Int. Cl.[4] B32B *31/18*
U.S. Cl. 156—406.4 **5 Claims**



1. A strip supplying device comprising:

supplying means for supplying long-narrow strips formed by coating cords with rubber to a forming drum while guiding said strips, said supplying means being disposed immediately before said drum;

moving means for moving said supplying means along the axis of said drum so that said strip is spirally wound on said drum with said strip's winding density changed in said drum widthwise direction as desired while being guided by said supplying means;

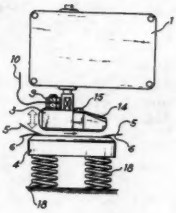
detecting means for detecting rotation of said drum and producing an output; and

control means for controlling said moving means according to the output of said detecting means, to control the directions of movement and the speed of movement of said supplying means.

4,877,478
DEVICE FOR CONTINUOUS HOT-SEALING OF THERMOPLASTIC FILMS

Angelo Cappi, Vignola, Italy, assignor to Awax S.r.L., Modena, Italy

Filed Jan. 27, 1988, Ser. No. 148,436
Claims priority, application Italy, Feb. 13, 1987, 40012 A/87
Int. Cl.[4] B30B *15/34*
U.S. Cl. 156—555 **6 Claims**



1. A device for continuous heat-sealing of a relatively moving thermoplastic film, said device comprising:

a sealing head;

a heated element on said sealing head;

a counter-plate disposed in close proximity to said sealing head to define a sealing zone between said counter-plate and said sealing head to accommodate in said zone the relatively moving thermoplastic film;

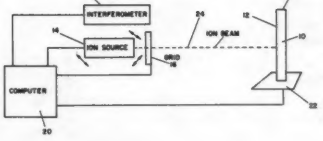
drive means operable for rapidly reciprocating said sealing head toward and away from said counter-plate so as to rapidly pound the relatively moving thermoplastic film between the sealing head heated element and the counter-plate and thereby effect heat sealing of the film; and

spring means mounting said counter-plate for movement so that, as the sealing head is operatively reciprocated to pound the thermoplastic film between the sealing plate and counterplate, said reciprocated movement of the sealing head imparts movement to said counter-plate thereby enhancing said rapid pounding of the relatively moving thermoplastic film between the sealing head and counter-plate.

4,877,479
METHOD AND APPARATUS FOR ION DEPOSITION AND ETCHING

John R. McNeil, and Scott R. Wilson, both of Albuquerque, N. Mex., assignors to University of New Mexico, Albuquerque, N. Mex.

Continuation-in-part of Ser. No. 28,246, Mar. 20, 1987, Pat. No. 4,758,304. This application Jun. 27, 1988, Ser. No. 212,272
Int. Cl.[4] B44C *1/22*; C03C *15/00*; C23C *14/00*; B05D *3/06*
U.S. Cl. 156—626 **16 Claims**



9. A method using ion etching for changing the existing topography of the surface of an object to a predetermined topography, the method comprising the steps of:

(a) comparing the existing topography of the surface to the predetermined topography,

(b) using an algorithm comprising image restoration, and using a plurality of ion sources, selectively etching material from the surface of the object to cause the surface to reach the predetermined topography.

4,877,480

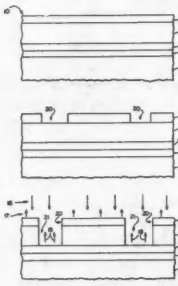
LITHOGRAPHIC TECHNIQUE USING LASER FOR FABRICATION OF ELECTRONIC COMPONENTS AND THE LIKE

Shyam Das, Acton, Mass., assignor to Digital Equipment Corporation, Maynard, Mass.

Continuation of Ser. No. 894,784, Aug. 8, 1986, abandoned. This application Jun. 6, 1988, Ser. No. 205,490

Int. Cl.[4] B44C *1/22*

U.S. Cl. 156—635 **9 Claims**



1. A process of etching a recess in a workpiece using laser radiation through a patterned mask defining the boundaries of the recess, wherein the improvement comprises using as the material comprising the mask a material that is reflective at the wavelengths of the laser radiation; providing a layer of liquid over the surface of the mask, the liquid selected to be substantially transparent to the radiation of the laser to be used and substantially non-reactive to the materials forming the workpiece at room temperature, and reactive to the materials forming the workpiece, except the material comprising the mask, at elevated temperatures produced by the laser radiation; and exposing the workpiece to laser radiation to remove material from the exposed portions for a time sufficient to produce a recess of the desired depth, the reflective mask preventing the portions covered thereby from being etched by the laser radiation.

4,877,481

PATTERNING METHOD BY LASER SCRIBING

Takeshi Fukuda, Ebina; Shunpei Yamazaki, Tokyo, and Akira Sugawara, Atsugi, all of Japan, assignors to Semiconductor Energy Laboratory Co., Ltd., Kanagawa, Japan

Filed May 27, 1988, Ser. No. 200,063

Claims priority, application Japan, May 28, 1987, 62-13324; May 28, 1987, 62-13326

Int. Cl.[4] B44C *1/22*; C03C *15/00, 25/06*; C23F *1/02*

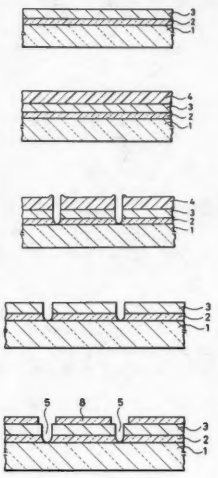
U.S. Cl. 156—643 **12 Claims**

1. A method of producing patterns on a first film formed on a substrate, the method comprising the steps of:

coating said first film with an organic buffer film;

irradiating said film with a laser beam through said organic buffer film;

removing the irradiated portions of said first film together with the overlying portions of said organic buffer film while leaving said substrate substantially intact to produce said patterns on said first film;



removing said organic buffer film with a solvent; and forming a second film on said first film.

4,877,482

NITRIDE REMOVAL METHOD

James H. Knapp, Gilbert; George F. Carney, and Francis J. Carney, both of Tempe, all of Ariz., assignors to Motorola Inc., Schaumburg, Ill.

Filed Mar. 23, 1989, Ser. No. 327,630

Int. Cl.[4] B44C *1/22*; C03C *15/00, 25/06*

U.S. Cl. 156—643 **15 Claims**

1. A method for removing nitride coatings from metal surfaces comprisng the steps of:

providing a metal surface having a nitride coating disposed thereon;

placing said nitride coated metal surface into a plasma reactor; and

exposing said nitride coated metal surface to a gaseous plasma comprising a reactive fluorine species.

4,877,483

METHOD FOR CONTACT BETWEEN TWO CONDUCTIVE OR SEMI-CONDUCTIVE LAYERS DEPOSITED ON A SUBSTRATE

Albert Bergemont, La Tronche, and Richard Ferrant, Aix En Provence, both of France, assignors to S.G.S. Thomson Microelectronics, S.A., Gentilly, France

Filed Jun. 29, 1988, Ser. No. 212,889

Claims priority, application France, Jul. 3, 1987, 87 09455

Int. Cl.[4] H01L *21/306*; B44C *1/22*; C03C *15/00*; C23F *1/02*

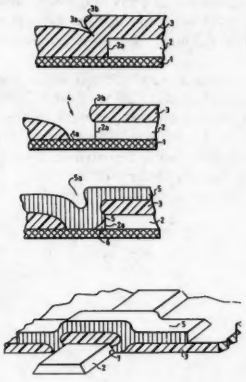
U.S. Cl. 156—653 **13 Claims**

1. A method for establishing a contact between two conductive or semiconductive layers deposited on a substrate, comprising the following steps:

depositing a first conductive or semiconductive layer on the substrate, and selectively etching said layer so as to define in said first layer regions having lateral edges;

depositing an insulating layer on the substrate, under pressure and temperature conditions such that the insulating layer has a thickness which is smaller around the lateral edges of said regions than over the remainder of the substrate including the remainder of said first layer regions;

chemically etching the insulating layer to an amount which is at least equal to the thickness of said insulating layer where it is smaller but which is substantially less than the thickness of said insulating layer elsewhere;



depositing a second conductive or semiconductive layer over the etched insulating layer under pressure and temperature conditions leading to high covering capacity, so as to form a contact between said first and second conductive or semiconductive layers at the edges of said first layer.

4,877,484

FLOCCED 2:1 LAYERED SILICATES AND WATER-RESISTANT ARTICLES MADE THEREFROM

Walter J. Bohrn, Lancaster; Richard A. Brubaker, Willow Street; Shelly N. Garman, Lancaster; Lewis K. Hosfeld, Mountville; Kenneth K. Ko, and Thomas M. Tymon, both of Lancaster, all of Pa., assignors to Armstrong World Industries, Inc., Lancaster, Pa.

Continuation-in-part of Ser. No. 715,973, Mar. 25, 1985, abandoned. This application Feb. 17, 1987, Ser. No. 15,756

The portion of the term of this patent subsequent to Nov. 17, 2004, has been disclaimed.

Int. Cl.[4] C04B *20/02, 20/06*

U.S. Cl. 162—103 **31 Claims**

1. A method of preparing a flocced mineral material that can be utilized to form a non-asbestos high temperature article that exhibits water resistance, this method comprising (1) contacting a layered silicate having an average charge per structural unit in the range of from about −0.4 to about −1 which was exchangeable interstitial ions that promotes layer swelling, and is selected from mica and vermiculite, with a polar liquid to cause gel formation and form a swelled layered silicate dispersion, and then (2) contacting the swelled layered silicate dispersion with at least one species of an exchange ion consisting essentially of a cationic diamine compound to flocculate the silicate by an ion exchange reaction between at least some of the exchangeable interstitial ions, and at least some of the exchange ions to form a flocculated silicate product.

4,877,485

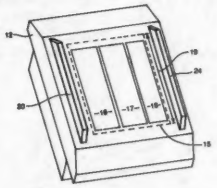
SHEET INSPECTION STATION WITH PNEUMATIC SHEET GUIDE

Keith J. Carson, Kalamazoo, Mich., assignor to Process Automation Business, Inc., Columbus, Ohio

Continuation of Ser. No. 56,025, Jun. 1, 1987, abandoned. This application Mar. 6, 1989, Ser. No. 320,852

Int. Cl.[4] D21F *7/06*; G01N *21/01*

U.S. Cl. 162—263 **4 Claims**



1. An inspection station of the type used in measuring physical properties of a continuously-moving web of paper having a direction of motion including a sensor package contained within a housing and having a cross-machine width, the sensor package being adapted to produce electrical signals indicative of one or more of the physical properties as the web is moving past the sensor package, sand sensor package including a web entrance end and a web exit end, and including sensor means on opposite sides of said web extending at least a portion of the cross-machine width, each of said sensor means including a sensor surface extending parallel to said web and spaced therefrom and wherein the improvement comprises pneumatic means to position the web in a desired path between and spaced from said sensor surfaces comprising a pair of air-directing means extending across substantially the cross-machine width of said sensor package and positioned to direct air onto opposite surfaces of said web at said web entrance end, each of said air-directing means extending out from its respective sensor surface toward said web and including at least one row of air-directing apertures for directing air onto said web surface substantially over the cross-machine width of said sensor package to space said web between said air-directing means and between and spaced from said sensor surfaces, wherein said air-directing means of said pair are spaced from each other in the direction of motion of said web.

4,877,486

HEADBOX FOR PAPER MACHINE WITH HOLLOW EXPANDING MEMBER FOR PROFILE BAR ADJUSTMENT

Werner Kade, and Hermann Rahmig, both of Heidenheim, Fed. Rep. of Germany, assignors to J.M. Voith GmbH, Heidenheim, Fed. Rep. of Germany

Filed Mar. 21, 1988, Ser. No. 170,793

Claims priority, application Fed. Rep. of Germany, Mar. 27, 1987, 3710058

Int. Cl.[4] D21F *1/02*

U.S. Cl. 162—336 **24 Claims**

1. Headbox for a paper machine for producing a paper web, comprising:

a first machine-wide flow guide wall;

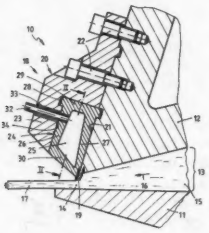
a second machine-wide flow guide wall disposed opposite said first flow guide wall and movable relative thereto;

said first and second flow guide walls defining therebetween a nozzle-like, machinewide stock channel having a machine-wide stock discharge opening;

said second flow guide of wall having means connected thereto proximate the stock discharge opening for adjusting the basis weight cross direction profile of the paper web produced in the paper machine, said means for adjusting including a machine-wide profile bar limiting the

effective width of the stock discharge opening and being adjustable relative to said second flow guide wall;

a hollow expanding member extending across the machine width having pressure chambers separated by intermediate walls arranged in succession across the machine width, which pressure chambers are supported against said second flow guide wall and can be pressurized independently of one another with a pressure fluid, the pressure chambers of said hollow expanding member having sidewalls oriented parallel to the direction of movement of the profile bar on the stock flow opening side of the sidewalls, the sidewalls being composed of a material of high elasticity, the pressure chambers further including an end wall facing the stock discharge opening and connecting the



sidewalls to one another, the end wall being stiffened by an armoring to avoid buckling;

said expanding member being guided parallel to the direction of movement of the profile bar on both sidewalls between planar sliding surfaces connected at least indirectly to said second flow guide wall, being fastened at a section thereof facing away from the profile bar at least indirectly to said second flow guide wall, and being connected at one of the sidewalls with the profile bar proximate the stock discharge opening, the profile bar being guided by one of said planar sliding surfaces corresponding to said one of the sidewalls such that the profile bar is moved by a flexible expansion of said one of the sidewalls running in the plane of aid one of said planar sliding surfaces.

4,877,487

BELT AND DRUM-TYPE PRESS WITH SUPPLEMENTAL NIP LOADING MEANS

Ray R. Miller, 8816 Warren Dr. N.W., Gig Harbor, Wash. 98335

Continuation-in-part of Ser. No. 94,137, Sep. 8, 1987, Pat. No. 4,758,310, which is a continuation-in-part of Ser. No. 849,931, Aug. 8, 1986, Pat. No. 4,710,271. This application Jul. 1, 1988, Ser. No. 214,594

The portion of the term of this patent subsequent to Dec. 1, 2004, has been disclaimed.

Int. Cl.[4] D21F *3/00*

U.S. Cl. 162—360.1 **17 Claims**

1. A drum and belt-type press for compressing a moving web or mat which comprises:

(a) a supporting frame;

(b) first and second spaced apart rotatable nip rolls mounted on the frame, said rolls having parallel axes of rotation, the first roll positioned as a belt entry nip roll and the second roll positioned as a belt exit nip roll;

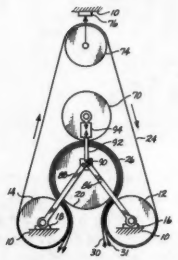
(c) a central drum adjacent the first and second nip rolls, the drum having an axis of rotation essentially parallel to said nip rolls;

(d) at least one idler nip roll having limited freedom of movement generally radial to the drum also being located adjacent the drum;

(e) an endless flexible belt having an inner generally U-shaped course and an outer generally U-shaped course, the inner and outer courses meeting in loops, one loop containing the first nip roll and the other loop containing the second nip roll, the inner course of the belt being wrapped around more than one half of the circumference of the drum, said first and second nip rolls being located within the body of the belt, said idler nip roll or rolls also being located within the body of the belt, between the first and second nip rolls, all of the nip rolls making nip contact with the drum through the interposed inner course of the belt

(f) at least one belt guide roll located within the body of the belt to support the outer course of the belt, said guide roll or rolls not making nip contact with the drum, the location and sizes of the guide roll or rolls and the nip rolls acting to maintain clearance between the outer course of the belt and the inner course of the belt;

(g) tensioning means to control belt tension;



(h) supplemental loading means for one or more of said idler nip roll or rolls, to create a desired nip force for said idler nip roll or rolls acting upon the drum, independent of belt tension, the location of all said idler nip rolls and the nature of the forces they exert on the drum being such and the press being constructed and arranged such that the net resultant force of all idler nip roll forces upon the drum is directed between the centers of rotation of the first and second nip rolls; and

(i) driving means for rotating the belt through its endless path so as to compress a web or mat interposed between the moving belt and drum,

the drum being structured and arranged to have freedom to move radially toward or away from the first and second nip rolls so that the drum presses upon the first and second nip rolls with a force controlled by belt tension and the net resultant force of the idler nip roll forces.

4,877,488

PASSIVE ACOUSTIC POWER SPECTRA TO MONITOR AND CONTROL PROCESSING

George D. Cody, Princeton, N.J.; Eugene R. Elzinga, Jr., Marquette, Mich.; Andrew J. Callegari, Princeton, and Roger W. Cohen, Trenton, both of N.J., assignors to Exxon Research and Engineering Company, Florham Park, N.J.

Continuation-in-part of Ser. No. 924,998, Oct. 30, 1986, abandoned. This application Jul. 13, 1987, Ser. No. 72,533

Int. Cl.[4] C10B *55/10*; C01H *13/00*

U.S. Cl. 201—1 **5 Claims**

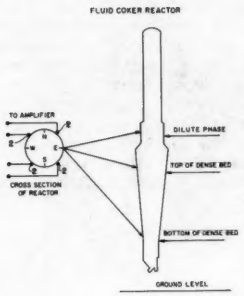
1. A process for the non-intrusive passive acoustic detection and measurement of a change in thickness of a wall defining a reactor for processing material, wherein said change in thickness is due to erosion of said wall or material buildup on said wall, the wall vibrations produced during processing of the material within the reactor by impact of the material with the interior surface of the wall comprising:

(a) measuring the wall vibrations of said reactor wall and then determining a first power spectrum indicative of the

measured wall vibrations as a function of frequency at a time t=0 while said reactor is operating,

(b) operating said reactor for a time t,

(c) measuring the wall vibrations of said reactor wall and then determining a second power spectrum indicative of the measured wall vibrations as a function of frequency at said time t, while said reactor is operating.



(d) determining a frequency shift of a resonance on said first spectrum from the corresponding resonance on said second spectrum, and

(e) correlating said frequency shift with the change in thickness of the reactor wall.

4,877,489

ELECTRONIC CONTROL AND DOSING SYSTEM FOR DESALINATORS

Ian Lloyd, Queensland, Australia, assignor to Nautical Services Pty. Ltd., Queensland, Australia

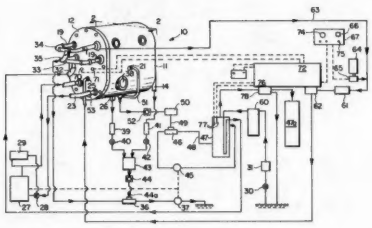
PCT No. PCT/AU86/00352, § 371 Date Jul. 21, 1987, § 102(e) Date Jul. 21, 1987, PCT Pub. No. WO87/03275, PCT Pub. Date Jun. 4, 1987

PCT Filed Nov. 21, 1986, Ser. No. 105,387

Claims priority, application Australia, Nov. 21, 1985, Ph 3506; Nov. 27, 1985, Ph 3611

Int. Cl.[4] B01D *3/42*; G01F *23/00*

U.S. Cl. 202—181 **16 Claims**



1. A feed water level control system for a desalinator including an evaporation chamber and a condenser zone including condenser coils, said feed water level control system including:

a feed water inlet to the evaporation chamber of the desalinator;

feed water valve means for controlling the flow of feed water through the inlet in response to the feed water level in the desalinator;

a perforate baffle, having openings therein and being disposed above the evaporator chamber, for allowing steam to pass therethrough to the condenser zone to be condensed;

electric probe means, including a plurality of spaced probes disposed above the baffle, for detecting the presence of water created by entrained bubbles which pass through the openings in the baffle; and

electronic control means, connected to said probe means and responsive thereto, for controlling the valve means such that when the water from said entrained bubbles contacts the probes, the valve means is shut off to terminate the flow of feed water to the inlet until bubbles are no longer entrained.

8. A foam and scale inhibitor dosing unit for a desalinator including:

a feed water inlet to the desalinator;

feed water valve means for controlling the flow of feed water through the inlet in response to the feed water level in the desalinator;

an inhibitor supply tank;

an inhibitor supply valve means for controlling the flow of inhibitor from the supply tank to the feed water; and

timer means for controlling said inhibitor supply valve means so as to permit a preset volume of inhibitor to be fed from the supply tank to the feed water.

4,877,490

DEHYDRATION OF FORMIC ACID BY EXTRACTIVE DISTILLATION WITH DICARBOXYLIC ACIDS

Lloyd Berg, 1314 S. Third Ave., Bozeman, Mont. 59715; Kraig M. Wendt, and Rudolph J. Szabados, both of Bozeman, Mont., assignors to Lloyd Berg, Bozeman, Mont.

Continuation-in-part of Ser. No. 126,003, Nov. 27, 1987, abandoned. This application Jan. 23, 1989, Ser. No. 299,977

Int. Cl.[4] B01D *3/40*; C07C *53/02*

U.S. Cl. 203—15 **2 Claims**

1. A method for recovering formic acid from mixtures of formic acid and water which comprises distilling a mixture of formic acid and water in a rectification column in the presence of about one part of an extractive agent per part of formic acid - water mixture, recovering water as overhead product and obtaining the formic acid and the extractive agent from the stillpot, wherein said extractive comprises oxalic acid and at least one member selected from the group consisting of ethyl benzoate and adiponitrile.

4,877,491

SEPARATION OF M-DIISOPROPYL BENZENE FROM P-DIISOPROPYL BENZENE BY AZEOTROPIC DISTILLATION WITH KETONES

Lloyd Berg, 1314 S. Third Ave., Bozeman, Mont. 59715, assignor to Lloyd Berg, Bozeman, Mont.

Filed Nov. 14, 1988, Ser. No. 270,200

Int. Cl.[4] B01D *3/38*; C07C *7/06*

U.S. Cl. 203—62 **1 Claim**

1. A method for recovering m-diisopropylbenzene from a mixture of m-diisopropylbenzene and p-diisopropylbenzene which comprises distilling a mixture of m-diisopropylbenzene and p-diisopropylbenzene in a rectification column in the presence of an azeotrope forming agent, recovering the m-diisopropylbenzene and the azeotrope forming agent as overhead product, obtaining the p-diisopropylbenzene from the stillpot, wherein said azeotrope forming agent is a ketone selected from the group consisting of 4-methoxy-4-methyl pentanone-2, 2-undecanone and isophorone.

4,877,492

METHOD OF MEASURING ELECTROLYTE IN BLOOD AND URINE BY ELECTRODE METHOD

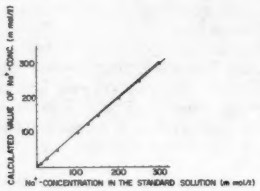
Hiroaki Uematsu, and Shinji Imanishi, both of Kyoto, Japan, assignors to Horiba, Ltd., Kyoto, Japan

Continuation of Ser. No. 948,064, Dec. 30, 1986, abandoned. This application Jun. 10, 1988, Ser. No. 204,994

Claims priority, application Japan, Jan. 11, 1986, 61-3800

Int. Cl.[4] G01N *27/26, 33/20, 33/49, 33/493*

U.S. Cl. 204—1 T 3 Claims



1. A method of measuring a concentration of at least one electrolyte selected from the group consisting of Na^+, K^+ and Cl^- in both a urine sample and a blood sample, which comprises:

preparing a calibrating solution containing at least one ion selected from the group consisting of Na^+ in an amount of 120 to 160 mmol/liter, K^+ in an amount of 4.0 to 6.0 mmol/liter and Cl^- in an amount of 100 to 140 mmol/liter;

preparing a diluent containing a buffering agent and at least one ion selected from the group consisting of Na^+ in an amount of 50 to 150 mmol/liter, K^+ in an amount of 0 to 4.0 mmol/liter and Cl^- in an amount of 50 to 150 mmol/liter, wherein said ions in said calibrating solution and said diluent are the same as said electrolyte to be measured;

diluting said urine sample with said diluent;

measuring said electrolyte in the diluted urine with an electrode using said calibrating solution;

calculating the concentration of said electrolyte in said urine sample based on the measured value; and

measuring the concentration of said electrolyte in said blood sample with an electrode using said calibrating solution.

4,877,493

DIELECTRIC BLOCK PLATING PROCESS

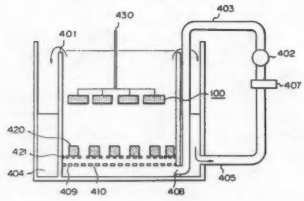
Osamu Yamato, and Tetsuji Takino, both of Tokyo, Japan, assignors to Oki Electric Industry Co., Ltd., Tokyo, Japan

Division of Ser. No. 189,165, May 2, 1988. This application Oct. 17, 1988, Ser. No. 258,856

Claims priority, application Japan, May 1, 1987, 62-106347

Int. Cl.[4] C25D *5/02*

U.S. Cl. 204—15 6 Claims



1. A dielectric block plating process for forming a conductive layer by an electroplating process over surfaces of a dielectric block, having parallel through holes extending from the top of the block to the bottom thereof and coated with a ground conductive layer formed by an electroless plating process, in a plating tank filled with an electrolytic solution, said dielectric block plating process comprising the steps of:

immersing said dielectric block in said electrolytic solution contained in said plating tank and threin orienting said dielectric block with axes of said through holes extending substantially vertically;

circulating said electrolytic solution through said plating tank and causing said electrolytic solution to flow therethrough in a generally vertically upward direction through said through holes;

applying a negative voltage to said ground conductive layer of said dielectric block and applying a positive voltage to said electrolytic solution to thereby electroplate at least inner surfaces of said through holes; and

removing the thus plated dielectric block from said electrolytic solution.

4,877,494

CORROSION RESISTANT PLATED STEEL STRIP AND METHOD FOR PRODUCING SAME

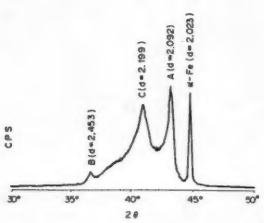
Tatsuya Kanamaru; Motohiro Nakayama; Katutoshi Arai; Shinichi Suzuki, and Ryoichi Naka, all of Tokai, Japan, assignors to Nippon Steel Corporation, Tokyo, Japan

Division of Ser. No. 174,830, Mar. 29, 1988. This application Mar. 7, 1989, Ser. No. 320,071

Claims priority, application Japan, Mar. 31, 1987, 62-79027; Aug. 6, 1987, 62-195343; Aug. 6, 1987, 62-195344; Aug. 26, 1987, 62-210253; Aug. 26, 1987, 62-210254; Sep. 22, 1987, 62-237765; Sep. 22, 1987, 62-237766; Dec. 17, 1987, 62-319830; Dec. 17, 1987, 62-319831; Jan. 8, 1988, 63-1187; Jan. 26, 1988, 63-15156; Jan. 28, 1988, 63-17626; Feb. 23, 1988, 63-40292; Feb. 23, 1988, 63-40293

Int. Cl.[4] C25D *7/06*

U.S. Cl. 204—28 13 Claims



1. A method for producing a corrosion resistant plated steel strip, comprising

forming, on at least one surface side of a substrate consisting of a steel strip, a principal plating layer by a co-deposition electro-plating procedure using an acid plating liquid containing zinc ions and trivalent chromium ions in amounts adequate to ensure that the principal plating layer comprises a zinc-chromium based alloy comprising more than 5% by weight but not more than 40% by weight of chromium and the balance consisting of zinc.

4,877,495
ELECTROLYTIC COLORING OF ANODIZED ALUMINUM

Willi Buchmeier, and Dieter Brodalla, both of Duesseldorf, Fed. Rep. of Germany, assignors to Henkel Kommanditgesellschaft auf Aktien, Duesseldorf, Fed. Rep. of Germany

Continuation of Ser. No. 202,761, Jun. 3, 1988, abandoned. This application Feb. 2, 1989, Ser. No. 306,287

Claims priority, application Fed. Rep. of Germany, Jun. 5, 1987, 3718849

Int. Cl.[4] C25D *11/22*

U.S. Cl. 204—42 **32 Claims**

1. A process for the electrolytic coloring of anodized surfaces of aluminum or aluminum alloy substrates, comprising subjecting to alternating current, with or without superimposed direct current, in electrolytic coloring effective amounts, in the presence of an aqueous electrolyte solution containing a color-imparting effective amount of a cationic dye.

32. A colored anodized surface of aluminum or an aluminum alloy produced by the process of claim 1.

4,877,496
ZINC-NICKEL ALLOY PLATING SOLUTION

Moriyuki Yanagawa, Kawasaki; Shunichi Ishida, Yamato; Ken Ogura, Okazaki, and Yushi Saito, Anjo, all of Japan, assignors to Nippon Hyomen Kagaku Kabushiki Kaisha, Japan

Filed Dec. 30, 1988, Ser. No. 291,962

Int. Cl.[4] C25D *3/56*

U.S. Cl. 204—44.2 **8 Claims**

3. A zinc-nickel alloy plating solution comprising, as represented in terms of metal ions, 4 to 30 g/liter of zinc, 0.05 to 4 g/liter of nickel, 50 to 220 g/liter of an alkali hydroxide, 4 to 110 g/liter of a complexing agent, 0.1 to 10 g/liter of a primary brightener and 0.01 to 0.2 g/liter of a booster brightener,

characterized in that

said primary brightener is at least one selected from the reaction products of at least one amine with epihalohydrin, and

said booster brightener is at least one aromatic aldehyde.

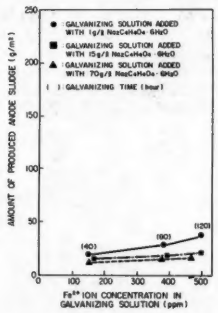
4,877,497
ACIDIC ELECTRO-GALVANIZING SOLUTION

Tsutomu Watanabe, and Akihiko Furuta, both of Tokyo, Japan, assignors to NKK Corporation, Tokyo, Japan

Filed Nov. 18, 1988, Ser. No. 273,910

Int. Cl.[4] C25D *3/22*

U.S. Cl. 204—55.1 **10 Claims**


GALVANIZING SOLUTION ADDED WITH 1g/l Na2C6H6O7·6H2O
GALVANIZING SOLUTION ADDED WITH 15g/l Na2C6H6O7·6H2O
GALVANIZING SOLUTION ADDED WITH 70g/l Na2C6H6O7·6H2O
GALVANIZING TIME (hour)
AMOUNT OF PRODUCED ANODE SLUDGE (g/m²)
Fe²⁺ ION CONCENTRATION IN GALVANIZING SOLUTION (ppm)
(40)
(90)
(120)

1. An acidic aqueous electro-galvanizing solution consisting essentially of:

zinc chloride: from 100 to 400g/l,

at least one substance selected from the group consisting of ammonium chloride and potassium chloride: from 100 to 400 g/l, and

at least one substance selected from the group consisting of saturated carboxylic acid, sodium salt thereof and potassium salt thereof: from 1 to 70 g/l.

4,877,498
METHOD FOR PRODUCING A METAL SALT BY ELECTROLYSIS

Kenichi Fukuda; Takashi Mori; Yasuhiro Kuranchi; Masaharu Doi, all of Shin-nanyo, and Tetsuya Suematsu, Tokuyama, all of Japan, assignors to Toyo Soda Manufacturing Co., Ltd., Shin-nanyo, Japan

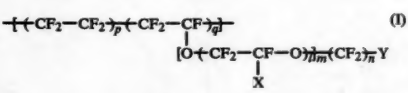
Continuation of Ser. No. 35,309, Apr. 7, 1987, abandoned. This application May 23, 1988, Ser. No. 198,663

Claims priority, application Japan, Apr. 7, 1986, 61-78255; Jun. 13, 1986, 61-135890

Int. Cl.[4] C25B *1/00;* C08D *5/20*

U.S. Cl. 204—86 **11 Claims**

1. A method for producing a metal salt by electrolysis in an electrolytic cell comprising an anode compartment and a cathode compartment partitioned by a diaphragm, characterized by disposing in the anode compartment a metal anode soluble in an aqueous electrolyte solution, and conducting electrolysis to dissolve the metal anode, wherein the diaphragm is a fluorinated anion exchange membrane made of a copolymer having repeating units of the formula:



wherein X is F or CF_3, l is an integer of from 0 to 5, m is 0 or 1, n is an integer of 1 to 5, each of p and q is a positive number and the ratio of p/q is from 2 to 16, and Y is a group involving a quaternary ammonium group.

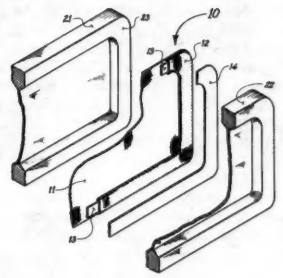
4,877,499
MEMBRANE UNIT FOR ELECTROLYTIC CELL

Richard N. Beaver, Angleton, Tex., and Gregory J. E. Morris, Milan, Italy, assignors to The Dow Chemical Company, Midland, Mich.

Continuation-in-part of Ser. No. 860,703, Jun. 5, 1986, which is a continuation of Ser. No. 668,043, Nov. 15, 1984, abandoned. This application Sep. 26, 1988, Ser. No. 249,546

Int. Cl.[4] C25B *1/16, 1/24, 9/00*

U.S. Cl. 204—98 **28 Claims**



27. A method of electrolysis comprising electrolyzing an alkali metal salt between a pair of electrodes separated by a membrane unit, said membrane unit comprising

(i) at least one sheet of an ion exchange membrane having a

gasket-bearing surface portion and an active surface portion;

(ii) at least one first non-gasket, non-frame means for strengthening the gasket-bearing surface portion of the membrane such that tearing or shear stresses on the gasket-bearing surface portion of the membrane is minimized when the gasket-bearing surface portion of the membrane is under a compressive force; and

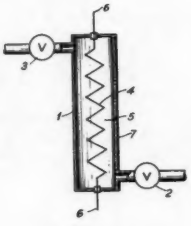
(iii) at least one second non-gasket, non-frame means for strengthening the gasket-bearing surface portion of the membrane such that tearing or shear stresses on the gasket-bearing surface portion of the membrane is minimized when the gasket-bearing surface portion of the membrane is under a compressive force,

said first and second strengthening means positioned only along the gasket-bearing surface portion of the membrane on at least one side of the membrane.

4,877,500
PROCESS FOR THE PRODUCTION OF CHLORINE DIOXIDE

Joseph Callerame, 2220 Casper Dr., Lake Havasu City, Ariz. 86403

Filed Jun. 30, 1988, Ser. No. 213,543
Int. Cl.[4] B01J *19/08*; C01B *11/02*
U.S. Cl. 204—157.48 **10 Claims**



1. Process of producing chlorine dioxide which comprises introducing chlorine gas and oxygen gas into a reaction space to form a reaction mixture and subjecting the reaction mixture thus obtained to ultraviolet radiation at a temperature at which chlorine is in the gaseous form.

4,877,501
PROCESS FOR FABRICATION OF LIPID MICROSTRUCTURES

Joel M. Schnur, 6009 Lincolnwood Ct., Burke, Va. 22015; Ronald Price, Slip 39, Dock P, Mears Point Marina, Rt. 50 & Kent Narrows, Grasonville, Md. 21638; Paul Yager, 206, 10th St., S.E., Washington, D.C. 20003; Paul Schoen, 5006 Taney Ave., Alexandria, Va. 22304; Jacque H. Georger, 8409 Great Lake Rd., Springfield, Va. 22153, and Alok Singh, 6340 Rockside St., Alexandria, Va. 22304

Filed Feb. 6, 1987, Ser. No. 11,838
Int. Cl.[4] B01J *19/08*; C07F *9/00*; C11B *3/00*
U.S. Cl. 204—157.64 **19 Claims**

1. Process for forming microstructures of selected shape and dimension from surfactants comprising the steps of:

selecting a lipid which self aggregates into a microstructure selected from the group consisting of helices and tubules;

selecting a lipid solvating organic solvent in which microstructures form;

dissolving the selected lipid in the selected organic solvent;

adding a non-solvent to the selected organic solvent in an amount sufficient to initiate microstructure growth;

allowing the selected lipid to grow into the microstructure in the solution of organic solvent and non-solvent for a period of time and at a temperature below the melting point of the selected lipid.

4,877,502
POLY(EPOXIDE) COATINGS CONTAINING A MANNICH BASE OF A HYDROXYSTYRENE CONTAINING POLYMER

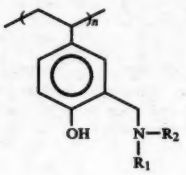
Donna L. Keene, Carrollton, Va., and Darrell D. Hicks, Jeffersontown, Ky., assignors to Hoechst Celanese Corporation, North Sommerville, N.J.

Filed Jul. 18, 1988, Ser. No. 219,697
Int. Cl.[4] C08L *29/00, 63/00*
U.S. Cl. 204—181.7 **21 Claims**

1. A coating composition which comprises a uniformly dispersed admixture of

A. a fluid carrier; and

B. a homopolymer or copolymer containing monomer units of the formula



wherein R_1 and R_2 are independently C_1 to C_{12} alkyl, or hydroxyalkyl, or aryl, wherein the comonomer is a substituted or unsubstituted component selected from the group consisting of styrene, acrylates, methacrylates and maleimides; said homopolymer or copolymer having a value of n which corresponds to an average molecular weight in the range of from about 360 to about 200,000; and

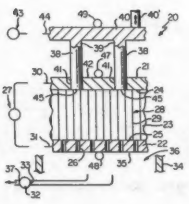
C. a poly(epoxide).

21. A method of protecting a metallic surface which comprises cationically electrodepositing the composition of claim 1 onto said surface and curing wherein the fluid carrier is water or a water/co-solvent mixture.

4,877,503
APPARATUS AND METHOD FOR REMOVING LIQUID FROM LIQUID BEARING MATERIAL

James T. Candor, 5440 Cynthia La., Dayton, Ohio 45429

Continuation-in-part of Ser. No. 213,709, Jun. 30, 1988, abandoned, which is a continuation-in-part of Ser. No. 189,974, May 4, 1988, abandoned, which is a continuation-in-part of Ser. No. 62,201, Jun. 15, 1987, Pat. No. 4,780,188, which is a continuation-in-part of Ser. No. 32,746, Mar. 31, 1987, Pat. No. 4,767,514. This application Dec. 14, 1988, Ser. No. 284,197
The portion of the term of this patent subsequent to Aug. 30, 2005, has been disclaimed.
Int. Cl.[4] B03C *5/00, 5/02*; B01D *57/02*
U.S. Cl. 204—182.1 **44 Claims**



1. In an apparatus for removing liquid from liquid bearing

material and comprising a pair of spaced apart electrodes for being disposed on opposite sides of said material, means for creating an electrostatic field between said electrodes for acting through said material to remove liquid from said material, and a projection extending from one of said electrodes so as to be disposed in said material between said electrodes to assist in removing liquid from said liquid bearing material, said electrodes comprising a pair of movable endless belts having adjacent runs thereof adapted to move in the same direction with said material disposed therebetween so as to move in the same direction therewith, the improvement wherein said apparatus has means to project said projection from said one electrode to different positions thereof relative to said material between said electrodes and relative to said one electrode at least some time during the time that said material is disposed between said electrodes.

4,877,504

METHODS FOR FABRICATING ELECTRO-OPTICALLY ACTIVE NIOBIUM DIOXIDE (NBO_2) THIN FILMS

James C. Lee, Plymouth, Minn., assignor to Honeywell Inc., Minneapolis, Minn.

Division of Ser. No. 717,261, Mar. 28, 1985, Pat. No. 4,712,857. This application Aug. 19, 1987, Ser. No. 86,858

Int. Cl.[4] C23C *14/08, 14/46*

U.S. Cl. 204—192.11 **10 Claims**

PLACE Nb TARGET IN SPUTTERING CHAMBER
GROUND TARGET
PLACE SUBSTRATE IN SPUTTERING CHAMBER
PROVIDE OXIDIZING ATMOSPHERE
EVACUATE CHAMBER TO PROCESS PRESSURE
HEAT SUBSTRATE TO SELECTED TEMPERATURE
GENERATE ION BEAM
DIRECT ION BEAM ONTO TARGET
CONTROL SPREAD OF ION BEAM
POSITION SUBSTRATE FOR THIN FILM DEPOSITION
TERMINATE AT DESIRED THICKNESS

1. A method of forming an electro-optically switchable niobium dioxide (NbO_2) crystalline thin film on a solid substrate by reactive ion-beam sputtering in a hermetic chamber, comprising:

placing a niobium (Nb) target in said chamber;

grounding said target;

placing said substrate in said chamber;

providing an oxidizing background atmosphere in said chamber;

evacuating said chamber to a pressure sufficient for said sputtering process;

heating said substrate to a temperature sufficient to allow said crystalline thin film to form on said substrate;

generating an ion-beam from a source;

directing said ion-beam onto said target so that Nb atoms are sputtered from said target;

controlling the spread of said ion-beam as said beam travels from said source to said target; and

positioning said substrate so that the majority of said Nb atoms sputtered from said target strike said substrate, thereby forming said electro-optically switchable thin film of NbO_2 on said substrate.

4,877,505

METHOD AND APPARATUS FOR APPLICATION OF COATINGS ON SUBSTRATES

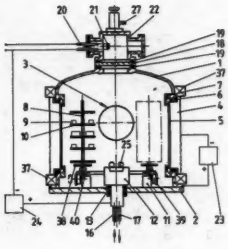
Erich Bergmann, Mels, Switzerland, assignor to Balzers Aktiengesellschaft, Fürstenstum, Liechtenstein

Filed Jun. 22, 1988, Ser. No. 209,866

Claims priority, application Switzerland, Aug. 26, 1987, 03275/87

Int. Cl.[4] C23C *14/34*

U.S. Cl. 204—192.38 **20 Claims**



1. A method for the application of a coating onto a functional area of a substrate, the coating being made of material having a metal fraction consisting essentially of one metal comprising:

placing the substrate, having the functional area to be coated, in a vacuum chamber;

converting a portion of said metal into a first vapor in the vacuum chamber and depositing the first vapor onto the substrate by magnetic field-supported sputtering; and

separately converting a further portion of said metal into a second vapor and depositing the second vapor onto the substrate by electric arc discharge using an electrode made of said metal;

said functional area of said substrate being exposed substantially during the whole application of the coating simultaneously to both the first vapor from the conversion by magnetic field-supported sputtering and the second vapor from the conversion by electric arc discharge, in such a way, that

the first vapor from the conversion by magnetic field-supported sputtering and the second vapor from the conversion by electric arc discharge are deposited jointly on the functional area, and substantially throughout the whole coating on the functional area at least five out of one hundred atoms of the metal are derived from the conversion by the electric are discharge and the remaining atoms are derived from the conversion by the magnetic field-supported sputtering.

4,877,506

MONOLITHIC SOLID ELECTROLYTE OXYGEN PUMP

Darrell C. Fee, 2529 Lee St., Woodridge, Ill. 60517; Roger B. Poeppel, 67 Stephanie La., Glen Ellyn, Ill. 60137; Timothy E. Easler, 564 N. Pinecrest, Bolingbrook, Ill. 60439, and Dennis W. Dees, 6224 Middaugh Ave., Downers Grove, Ill. 60517

Filed Apr. 8, 1987, Ser. No. 35,799

Int. Cl.[4] C25B *9/00*

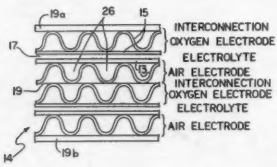
U.S. Cl. 204—242 **15 Claims**

1. An oxygen pump for removing oxygen from an oxygen-bearing gas comprising:

an anode comprised of a non-oxidizing material and formed of a first corrugated portion and a second planar portion in contact with said first corrugated portion so as to form a first plurality of elongated, generally linear corrugations therein;

a cathode formed of a third corrugated portion and a fourth planar portion in contact with said third corrugated portion so as to form a second plurality of elongated, generally linear corrugations therein;

a thin, porous, flat, electrically conductive solid electrolyte having first and second opposed electrode surfaces disposed between and in respective electrical contact with the second planar portion of said anode and with the fourth planar portion of said anode, wherein a first plural-



ity of closed channels is formed between the third corrugated portion and the fourth planar portion of said cathode and a second plurality of closed channels is formed between the first corrugated portion and the second planar portion of said anode; and

a DC potential source coupled to said anode and said cathode for applying a DC voltage thereacross for transferring oxygen form an oxygen-bearing gas introduced into said first plurality of closed channels through said solid electrolyte and into said second plurality of closed channels.

4,877,507

LININGS FOR ALUMINUM REDUCTION CELLS

Tom J. Hudson, Beaconsfield; John McIntyre, Kingston; Pierre Tremblay, Chicoutimi; Claude Allaire, Chicoutimi-Nord, and Bohdan Gnyra, Kingston, all of Canada, assignors to Alcan International Limited, Montreal, Canada

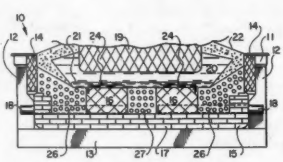
Continuation-in-part of Ser. No. 138,503, Dec. 24, 1987. This application Jul. 13, 1988, Ser. No. 218,834

Claims priority, application Canada, Jul. 14, 1987, 542053; Aug. 28, 1987, 545660

The portion of the term of this patent subsequent to Oct. 31, 2005, has been disclaimed.

Int. Cl.[4] C25C *3/08;* C21B *7/04;* C04B *35/10*

U.S. Cl. 204—243 R **61 Claims**



1. An aluminum electrolytic cell having a cell floor and cell walls for containing liquid cell components comprising aluminum and an electrolyte, a lining for said cell floor, a lining for said cell walls and one or more anodes capable of dipping into said liquid electrolyte from above and each having an anode surface spaced from but confronting said cell floor lining, said cell floor lining, at least at the upper surface thereof, comprising a region made of solid electrically conductive material, and at least one region made of a solid refractory electrically non-conductive material extending between the electrically conductive material and the cell wall lining, and at least one current collector bar extending from outside the cell into said cell floor lining beneath said upper surface and forming electrically conductive contact with said solid electrically conductive material, wherein the electrically non-conductive material comprises a close-packed array of alumina shapes, the gaps between the shapes substantially filled with particulate alumina in one or more fractions having discrete particle size ranges, including a fraction having an average particle diameter no more than 20% of the average diameter of the shapes, the mass having a bulk density of at least 2.0 g/cc.

4,877,508

HIGHLY DURABLE CATHODE OF LOW HYDROGEN OVERVOLTAGE AND METHOD FOR MANUFACTURING THE SAME

Takeshi Morimoto, and Eiji Endoh, both of Yokohama, Japan, assignors to Asahi Glass Company, Ltd., Tokyo, Japan

Continuation of Ser. No. 834,332, Feb. 4, 1986, Pat. No. 4,780,452. This application Oct. 5, 1988, Ser. No. 253,616

Int. Cl.[4] C25B *11/04, 11/06*

U.S. Cl. 204—290 R **12 Claims**

1. A highly durable cathode of low hydrogen overvoltage, which comprises an electrode core material having on the surface thereof a metal layer containing electrode active metal particles at least a portion of which particles comprises a hydrogen absorbing metal capable of electrochemically absorbing and desorbing hydrogen, wherein said metal layer has a porosity of about 20 to 90%, and further wherein a portion of said electrode active metal particles comprises Raney nickel or Raney cobalt or a mixture thereof, and said hydrogen absorbing metal is selected from the group consisting of Mischmetal/nickel system alloys, and titanium/nickel system alloys.

4,877,509

SEMICONDUCTOR WAFER TREATING APPARATUS UTILIZING A PLASMA

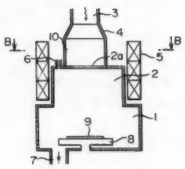
Toshiaki Ogawa; Nobuo Fujiwara; Kenji Kawai; Teruo Shibano; Hiroshi Morita, and Kyusaku Nishioka, all of Itami, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Japan

Filed Nov. 10, 1988, Ser. No. 269,688

Claims priority, application Japan, Jul. 5, 1988, 165813

Int. Cl.[4] C23C *14/34;* B05B *5/02*

U.S. Cl. 204—298 **8 Claims**



1. An apparatus for treating semiconductor wafers utilizing a plasma generated by electron cyclotron resonance comprising:

a first chamber accommodating means for supporting a semiconductor wafer;

a second chamber disposed adjacent to and in communication with said first chamber;

gas supplying means for supplying a gas to said second chamber;

a microwave source;

waveguide means operatively coupled to said microwave source for guiding microwave energy generated by said microwave source toward said second chamber, said waveguide means comprising converter means for converting microwaves propagating in a rectangular mode into microwaves propagating in a circular mode;

circular polarization means interposed between said waveguide means and said second chamber for rotating the direction of oscillation of an electric field of microwves in a circular TE_{11}) mode supplied from said waveguide means one complete turn in a circumferential direction in one period of the microwave, thereby converting the microwave in a circular mode into chamber polarized microwaves, said circular polarization means comprising means for supplying the circularly polarized microwaves to said second chamber; and

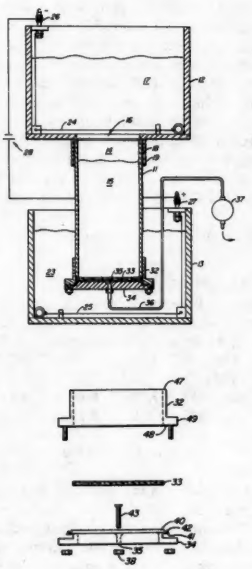
electromagent means surrounding at least said second chamber for forming a magnetic field in said first and second chambers, said electromagnet means forming in said second chamber a magnetic field of a magnetic flux density sufficient to produce electron cyclotron resonance in cooperation with the microwave energy supplied from said circular polarization means, thereby generating a plasma of said gas in said second chamber, said electromagnet means forming in said first chamber a magnetic field diverging in a direction from said second chamber to said support means, thereby causing a plasma generated in said second chamber to be transported to said semiconductor wafer supported by said means for supporting.

4,877,510

APPARATUS FOR PREPARATIVE GEL ELECTROPHORESIS

Jin-Hai Chen, Santa Monica, Calif., assignor to Bio-Rad Laboratories, Inc., Hercules, Calif.

Filed Oct. 25, 1988, Ser. No. 262,905
Int. Cl.[4] G01N *27/28, 27/26*
U.S. Cl. 204—299 R **22 Claims**



1. Apparatus for drawing solutes eluting from an open-ended tubular electrophoresis column having a given cross section into transfer tubing, said apparatus comprising

a porous plate and a dialysis membrane, both sized to span said cross section, said dialysis membrane being impermeable to said solutes;

a collar adapted to receive said open end and to secure said porous plate and said dialysis membrane thereto;

a plurality of channels in said collar communicating the exterior of said collar with a plurality of loci along the interior wall thereof, said loci positioned to reside along the periphery of said open end of said tubular electrophoresis column when said collar is joined thereto; and

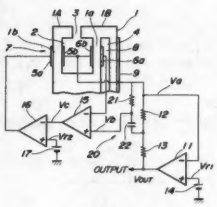
means for drawing fluid from said porous plate at a withdrawal site within the periphery thereof.

4,877,511

OXYGEN CONCENTRATION-SENSING DEVICE

Toyohei Nakajima, and Toshiyuki Mieno, both of Wako, Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Dec. 28, 1988, Ser. No. 290,955
Claims priority, application Japan, Dec. 28, 1987, 62-332845
Int. Cl.[4] G01N *27/58*
U.S. Cl. 204—406 **4 Claims**



1. In an oxygen concentration-sensing device including an oxygen concentration-sensing element formed by an oxygen-pumping element and a cell element, each composed of a member of a solid electrolytic material having oxygen ion-conductivity, and a pair of electrodes having said member interposed therebetween, one of said electrodes of said oxygen-pumping element and one of said electrodes of said cell element being connected to each other, said oxygen-pumping element and said cell element defining a gas diffusion-limiting zone therebetween, a current-to-voltage converter circuit having an input terminal connected to a junction between said connected ones of said electrodes, and a conversion output terminal, first amplifier means for generating an output having a level variable in response to a difference between a potential at said conversion output terminal of said current-to-voltage converter circuit and a potential at the other of said electrodes of said cell element, said first amplifier means applying said output thereof to the other of said electrodes of said oxygen-pumping element, and second amplifier means having an input thereof connected to said junction between said connected ones of said electrodes for generating an output proportional to current flowing in said oxygen-pumping element,

the improvement wherein said current-to-voltage converter circuit includes gain-changing means for imparting a higher gain to said first amplifier means when said current flowing in said oxygen-pumping element is in a high frequency range.

4,877,512

SILVER/SILVER CHLORIDE COMPOSITIONS

Richard E. Bowns, Hacienda Heights, and David L. Diepholz, Upland, both of Calif., assignors to Advanced Products, Inc., Ontario, Calif.

Filed Aug. 31, 1988, Ser. No. 238,808
Int. Cl.[4] G01N *27/30, 27/46*
U.S. Cl. 204—435 6 Claims

1. A conductive silver/silver chloride composition consisting essentially of:

(a) about 6 to about 10.5 parts by weight of a vinylidene chloride thermoplastic polymer having a glass transition value of above about 100° F.;

(b) at least a sufficient amount of an organic solvent capable of dissolving polymer (a);

(c) about 47 to about 57 parts by weight of silver flake; and

(d) about 8 to about 16 parts by weight of silver chloride.

4,877,513

OIL CHARACTERISTIC IMPROVEMENT PROCESS AND DEVICE THEREFOR

William M. Haire, Huntington Beach, and Celestino Pou, Diamond Bar, both of Calif., assignors to Hydrocarbon Sciences, Inc., Bakersfield, Calif.

Filed Dec. 11, 1987, Ser. No. 131,944
Int. Cl.[4] C10G *9/14*
U.S. Cl. 208—106 28 Claims

17. A process for increasing the volume of light hydrocarbons distilled from a heavy oil feedstock having an API gravity of 20° or less than a gas-free viscosity of 100 centipoises or more at a selected temperature, the process including the following steps:

(1) mixing the heavy oil feedstock with one or more organic reagents having a terminal hydroxyl group;

(2) heating the mixture resulting from step (1) from 300° F. to 750° F. and simultaneously exposing the mixture to a ferrous metal;

(3) separating the vapor and liquid phases resulting from step (2); and

(4) separating the hydrocarbons resulting from step (3).

4,877,514

CARBO-METALLIC OIL CONVERSION PROCESS AND CATALYSTS

William P. Hettinger, Russell, Ky., and H. Wayne Beck, Seabrook, Tex., assignors to Ashland Oil, Inc., Ashland, Ky.

Continuation of Ser. No. 30,752, Mar. 25, 1987, abandoned, which is a continuation of Ser. No. 888,172, Jul. 18, 1986, abandoned, which is a continuation of Ser. No. 516,484, Jul. 22, 1983, Pat. No. 4,612,298, which is a continuation of Ser. No. 328,353, Dec. 7, 1982, abandoned. This application Nov. 10, 1988, Ser. No. 271,414
Int. Cl.[4] C10G *11/05*
U.S. Cl. 208—120 15 Claims

1. A continuous process for cracking of a residual hydrocarbon feedstock into lower molecular weight hydrocarbon transportation fuels, said cracking being carried out in the presence of a catalyst having catalyst parameters comprising porosity, metals content, rare earth content, and zeolite content, said residual hydrocarbon feedstock comprising metal contaminants, fractions boiling above 1025° F. comprising asphaltenes, polynuclear aromatics, naphthenes and prophyrins, which process comprises in combination the steps of:

A. providing an aqueous slurry of a colloidal matrix material selected from the group consisting of silica colloid, alumina colloid, and mixtures thereof at a pH in the range selected from the group of ranges consisting of (1) about 3.5 to about 5.5 and (2) about 7 to about 13, said pH being selected to retard gelation of said colloidal matrix material;

B. providing an aqueous slurry of fluidizable clay particles adjusted to a pH substantially the same as that of said colloidal matrix material;

C. providing an aqueous slurry comprising calcined crystalline zeolite;

D. preparing each of said aqueous slurries from ingredients including water, wherein total sodium content of a spray dried composite comprising said slurries is less than about 0.25 percent by weight sodium oxide;

E. thoroughly mixing said slurries to provide a mixture of slurries;

F. feeding said mixture into a spray drier to provide a fluidizable catalyst suitable for fluid catalyst cracking having less than 0.25 wt.% sodium oxide, said catalyst being prepared at the same site where said conversion process is being conducted, and said catalyst being adapted to optimize said catalyst parameters comprising porosity, metals content comprising rare earth metals and zeolite content with respect to composition of said feedstock; and

G. contacting said catalyst in a riser cracking zone with said hydrocarbon feedstock under hydrocarbon cracking conditions comprising a catalyst-to-oil ratio in the range of about 5:1 to 20:1, a product recovery temperature within the range of 950° F. to 1150° F., and a reactant residence time of less than 3 seconds to produce hydrocarbon transportation fuels.

4,877,515

USE OF POLYSULFIDE TREATED MOLECULAR SIEVES TO REMOVE MERCURY FROM LIQUEFIED HYDROCARBONS

Costandi A. Audeh, Princeton, N.J., assignor to Mobil Oil Corporation, New York, N.Y.

Filed Sep. 30, 1987, Ser. No. 102,958
Int. Cl.[4] C10G *25/00*; B01J *27/02*
U.S. Cl. 208—251 R 9 Claims

1. A process for removing mercury from a liquid hydrocarbon stream or dry gaseous stream comprising:

(a) drying a molecular sieve at a temperature of between 350 and 450° C. in an anhydrous nonreactive atmosphere:

(b) contacting said molecular sieve with an aqueous solution of water soluble alkali polysulfide until said molecular sieve is saturated with said aqueous solution;

(c) drying said saturated molecular sieve of (b) at a temperature between about 10 and about 75° C. and a pressure of less than about 500 millimeters of mercury to deposit said water soluble alkali polysulfide onto said molecular sieve without decomposing the water soluble alkali polysulfide;

(d) contacting said gaseous or liquid hydrocarbon stream with said dried molecular sieve of (c) and recovering a gaseous or liquid hydrocarbon stream depleted of mercury.

4,877,516

MANIPULATING PARTICULATE MATTER

Cornelius J. Schram, Pavenham, England, assignor to National Research Development Corporation, London, England

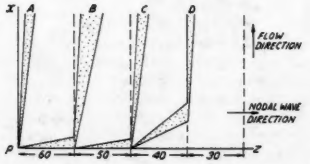
PCT No. PCT/GB87/00363, § 371 Date Jan. 27, 1988, § 102(e) Date Jan. 27, 1988, PCT Pub. No. WO87/07178, PCT Pub. Date Dec. 3, 1987
PCT Filed May 27, 1987, Ser. No. 153,833
Claims priority, application United Kingdom, May 27, 1986, 8612759
Int. Cl.[4] B03B *3/02*
U.S. Cl. 209—155 19 Claims

1. A method of manipulating particles in a fluid medium, comprising the steps of:

(a) injecting ultrasonic energy into a fluid medium and establishing an ultrasonic standing wave in the medium;

(b) choosing standing wave characteristics of said standing wave in relation to the particles so as to accumulate at least a portion of the particles at least at one nodal plane of the standing wave in the fluid medium;

(c) giving a varying spatial energy density distribution to said standing wave in at least one of its at least one nodal planes in the fluid medium; and



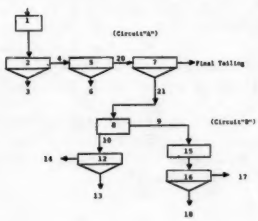
(d) controlling positions of the particles in said at least one nodal plane by the varying energy density of the standing wave in each said at least one nodal plane.

4,877,517

DEPRESSANT FOR FLOTATION SEPARATION OF POLYMETALLIC SULPHIDIC ORES

Srdjan Bulatovic, Peterborough, and Tim M. Jessup, Lakefield, both of Canada, assignors to Falconbridge Limited, Toronto, Canada

Filed May 2, 1988, Ser. No. 188,949
Int. Cl.[4] B03D *1/02*
U.S. Cl. 209—167 **20 Claims**



1. A process for the froth flotation separation of value metal minerals and iron sulphidic minerals contained in polymetallic sulphidic minerals, wherein said iron sulphidic minerals contained in said polymetallic sulphidic minerals are being depressed, comprising the steps of:

(a) preparing a depressant agent by first chemically reacting a causticized cationic starch with a cross-linking agent selected from the group consisting of: carbon disulphide, aminoacetonitrile and diethylenetriamine, thereafter chemically combining the resultant cross-linked causticized cationic starch with a polyacrylate, and lastly chemically reacting the resultant cross-linked causticized cationic starch-polyacrylate with lignin sulphonate;

(b) adding said depressant agent to an aqueous slurry of the polymetallic sulphidic minerals in an amount sufficient to depress the iron sulphidic minerals when subjected to froth flotation, and

(c) subjecting said aqueous slurry containing said depressant agent to froth flotation to obtain a predominantly non-ferrous sulphidic mineral-containing froth and a tailing containing said iron sulphidic minerals.

4,877,518

ORE FLOTATION EMPLOYING DIMERCAPTOTHIADIAZOLES

Clarence R. Bresson, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed May 2, 1988, Ser. No. 189,458
Int. Cl.[4] B03D *1/02*
U.S. Cl. 209—167 **23 Claims**

1. A process for recovery of minerals comprising:

(a) mixing crushed ore containing said minerals, water, and a sufficient amount of a dimercaptothiadiazole to depress a first portion of said minerals, said dimercaptothiadiazole having the formula:

wherein M and M' are selected from the group consisting of hydrogen and alkali metal atoms, to establish a pulp;

(b) aerating said pulp to produce a froth and a resultant pulp, said froth containing a second portion of said minerals while allowing said first portion of said minerals to be depressed in said resultant pulp; and

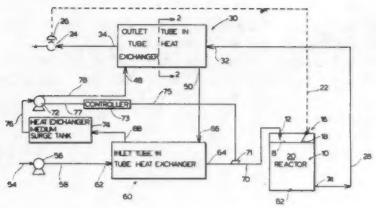
(c) recovering said second portion of said minerals from said froth.

4,877,519

REACTOR AND HEAT EXCHANGER SYSTEM FOR CYANIDE WASTE WATER TREATMENT

Herbert L. Robey, Milton, Canada, assignor to Cyanide Destruct Systems, Inc., Ontario, Canada

Filed Jun. 28, 1988, Ser. No. 212,494
Int. Cl.[4] B01D *17/12*
U.S. Cl. 210—86 **6 Claims**



1. In a waste water treatment system for high temperature hydrolysis of cyanide in a waste water stream, said system having a reactor constructed to operate at a sufficiently high temperature and pressure to effect hydrolysis of cyanide in a waste water stream introduced to said reactor and a heat exchanger system, with a means for flowing an influent waste water stream through said heat exchanger system prior to introduction to said reactor and a means for an effluent stream from said reactor through said heat exchanger system,

the improvement comprising said heat exchanger system having a first double pipe heat exchanger for said influent stream, and a second double pipe heat exchanger for said effluent stream, each of said double pipe heat exchangers having an inner tube which defines a tube side tube of the heat exchanger and an annular space between an outer tubular shell and said inner tube to define an annular space tube of the heat exchanger, said first and second heat exchanger each having an inlet for the tube side of said corresponding heat exchanger and an inlet for the annular space of the corresponding heat exchanger, a first conduit for delivering said influent stream to said tube side inlet of first heat exchanger, a second conduit for delivering said effluent stream from said reactor to said tube side inlet of said second heat exchanger, said first and second heat exchanger each having an outlet for the tube side of said corresponding heat exchanger and an outlet for the annular space of the corresponding heat exchanger, means for circulating a heat exchange medium through said annular space inlets and outlets of said first and second heat ex-

changers to preheat said influent stream prior to introduction into said reactor where energy for preheating is extracted by said second heat exchanger from said effluent stream passing through said second heat exchanger to add heat energy to said heat exchange medium, said first heat exchanger removing heat energy from said heat exchange medium to preheat said influent stream whereby influent and effluent streams pass through said tube side of each inner tube of said first and second heat exchangers to minimize clogging of said first and second heat exchanger;

said reactor comprising a closed vessel with an inlet and an outlet, a third conduit extending from said tube side outlet of said first heat exchanger to said reactor inlet, said second conduit being connected to said reactor outlet, said reactor having a level control device located below said inlet to provide a liquid level in said reactor below said inlet to ensure that said inlet is above reacting liquid in said reactor, said outlet located at a lower level in said reactor to define a downflow reactor zone, said level control device comprising a control valve for controlling liquid flow in said reactor located below said inlet, said liquid level sensor generating a signal to open fully said control valve when said liquid level sensor senses liquid, means for fully closing said valve after sufficient liquid is drained from said reactor to drop reacting liquid level below said liquid level sensor to provide an intermittent flow of effluent to said second conduit.

4,877,520

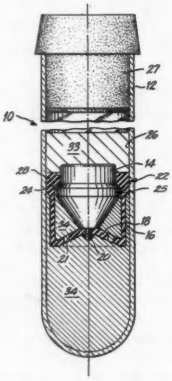
DEVICE FOR SEPARATING THE COMPONENTS OF A LIQUID SAMPLE HAVING HIGHER AND LOWER SPECIFIC GRAVITIES

James A. Burns, Elizabeth, N.J., assignor to Becton, Dickinson and Company, Franklin Lakes, N.J.

Continuation-in-part of Ser. No. 106,092, Oct. 10, 1987, Pat. No. 4,818,386. This application Jun. 6, 1988, Ser. No. 202,625

Int. Cl.[4] B01D *17/038, 21/26*

U.S. Cl. 210—94 **11 Claims**



1. Apparatus for separating the constituents in a liquid sample introduced into said apparatus into those constituents having a higher specific gravity from those constituents having a lower specific gravity under the action of centrifugal force, comprising

(a) a tube-shaped transparent container having a closed end and an open end and defining a sample receiving chamber;

(b) a stopper for closing said open end of said container; and

(c) a dual barrier assembly movable axially in said container under the action of centrifugal force;

(d) said dual barrier assembly having a specific gravity intermediate the specific gravity of constituents having a higher specific gravity and constituents having a lower specific gravity of a sample introduced into said container;

(e) said dual barrier assembly providing selectively a dual annular seal and open passage therearound in response to pressure differentials in said container above and below said dual barrier assembly;

(f) said dual barrier assembly comprising

(1) a cup-shaped flexible portion;

(2) said cup-shaped flexible portion having a first annular ring adjacent the upper edge thereof;

(3) the outer circumferential edge of said first annular ring selectively movable into and out of sealing engagement with the internal wall of said container chamber in response to alternating equal and different pressures above and below said dual assembly;

(4) means defining at least one opening in the bottom wall of said cup-shaped flexible portion providing flow communication therethrough;

(5) a round solid core portion nested in said cup-shaped portion;

(6) a second annular ring extending from the outer surface of said solid core portion;

(7) said solid core portion movable vertical in said cup-shaped portion for causing said first and second ring to move into and out of sealing engagement with each other in response to alternating equal and different pressures above and below said dual assembly;

(8) said bottom wall of said cup-shaped portion having a raised central section providing spring action responsive to pressure differentials on each side of said dual barrier assembly; and

(9) means connecting said solid core portion and said raised central section of said bottom wall of said flexible cup-shaped portion.

4,877,521

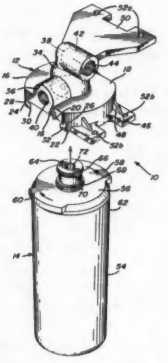
QUICK-CHANGE FILTER CARTRIDGE AND HEAD THEREFOR

Raymond M. Petrucci, Middlebury; Bruce G. Taylor, Kensington; Edward C. Giordano, Manchester, all of Conn.; James M. Padiall, Covina Heights, and Carl Palmer, La Habra Heights, both of Calif., assignors to CUNO, Incorporated, Meriden, Conn.

Continuation of Ser. No. 44,895, Apr. 30, 1987, Pat. No. 4,735,716, which is a continuation-in-part of Ser. No. 822,536, Jan. 27, 1986, abandoned. This application Mar. 25, 1988, Ser. No. 173,689

Int. Cl.[4] B01D *27/08*

U.S. Cl. 210—171 **14 Claims**



1. A replaceable filter canister for a permanently installed filter head of a type having first and second ports in fluid

communication with a cylindrical chamber having an interior surface which is intended to receive said filter canister, said filter canister comprising:

a flask shaped housing having a main body with a top surface;

a cylindrical neck projecting from said top surface, said neck being intended to be slidably received and rotatable in said cylindrical chamber of said head, said neck having an external cylindrical surface and an internal surface, said external cylindrical surface having an external diameter which is approximately uniform over the entire height of said neck;

tube means for conveying fluid, said tube means disposed in said housing and said neck, said tube means having an upper part extending into said neck and a lower part in sealed fluid communication with said upper part and extending into said housing, the external cross-sectional area of said upper part of said tube means being smaller than the adjacent internal cross-sectional area of said internal surface of said neck proximate thereto to define a clearance therebetween;

filter means for filtering fluid, said filter means disposed in said housing and adapted around said lower part of said tube means, one part of said filter means being in sealed fluid communication with said clearance and another part of said filter means being in sealed fluid communication with said lower part of said tube means;

a first seal disposed circumferentially in and around said external cylindrical surface of said neck and proximate the upper distal end thereof, said first seal intended to make slidable sealable contact with said interior surface of said cylindrical chamber of said head;

a first space bounded in part by said first seal and said external cylindrical surface of said neck above said first seal, and when said cylindrical chamber of said head has received said canister bounded in part by said interior surface of said cylindrical chamber, such that one of said first and second ports in said head is in sealed fluid communication with said first space;

a second seal disposed circumferentially in and around said external cylindrical surface of said neck and disposed below said first seal, said second seal intended to make slidable sealable contact with said interior surface of said cylindrical chamber of said head;

a second space bounded in part by said first and second seals and said external cylindrical surface of said neck between said first and second seals, and when said cylindrical chamber of said head has received said canister bounded in part by said interior surface of said cylindrical chamber, such that the other one of said first and second ports in said head is in sealed fluid communication with said second space;

a first opening into said canister through said neck in sealed fluid communication with said clearance and one of said first and second spaces; and

a second opening into said canister through said neck in sealed fluid communication with said upper part of said tube means and the other one of said first and second spaces,

wherein one of said first and second openings into said canister is located above said first seal and is in sealed fluid communication with said first space,

wherein the other one of said first and second openings is located below said first seal and above said second seal and extends radially inwardly from said external cylindrical surface of said neck and is in sealed fluid communication with said second space, and

whereby fluid directed at one of said first and second spaces will flow into said canister through said clearance, thence into said filter means, thence into said tube means, and thence out of said canister into the other one of said first and second spaces.

4,877,522

LIQUID SUPPLY APPARATUS

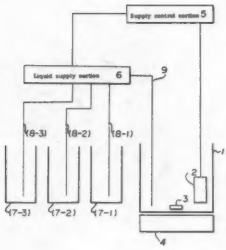
Junichi Toei, Sagamihara, and Nobuyuki Baba, Yamato, both of Japan, assignors to Tosho Corporation, Shin-nanyo, Japan

Continuation of Ser. No. 191,239, May 6, 1988, abandoned. This application Mar. 1, 1989, Ser. No. 319,874

Claims priority, application Japan, May 11, 1987, 62-112274

Int. Cl.[4] B01D *15/08*

U.S. Cl. 210—198.2 **3 Claims**



1. A liquid supply apparatus for providing a precisely predetermined volume of liquid mixture having a precisely predetermined hydrogen ion concentration for liquid chromatography, comprising:

a mixing tank;

stirring means for stirring a liquid mixture in said mixing tank;

electrode means for measuring a hydrogen ion concentration of said liquid mixture in said mixing tank;

a plurality of supply liquid tanks for storing different supply liquids;

liquid supply section means for supplying controlled volumes of said supply liquids to said mixing tank; and

supply control section means for controlling said liquid supply section means, including:

(a) means for calculating first volumes of said supply liquids such that a liquid mixture having a first volume less than said predetermined volume will have a hydrogen ion concentration equal to said predetermined hydrogen ion concentration,

(b) means for controlling said liquid supply section means for supplying said first volumes of said supply liquids to said mixing tank until a measured hydrogen ion concentration of said liquid mixture equals said predetermined hydrogen ion concentration of said liquid mixture;

(c) means for determining the total volume of said supply liquids supplied to said mixing tank when the measured hydrogen ion concentration of said liquid mixture equals said predetermined hydrogen ion concentration of said liquid mixture;

(d) means for calculating additional volumes of said supply liquids such that a liquid mixture having said total volume plus said additional volumes of said supply liquid will have said predetermined volume; and

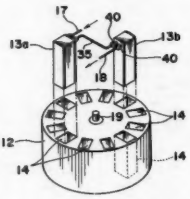
(e) means for controlling said liquid supply section means for supplying said additional volumes of said supply liquids to said supply mixture in said mixing tank until the volume of the liquid mixture in said mixing tank equals said predetermined volume, while maintaining said measured hydrogen ion concentration of the mixed liquid in said mixing tank at said predetermined hydrogen ion concentration.

4,877,523

CENTRIFUGAL COUNTER-CURRENT DISTRIBUTION CHROMATOGRAPHY

Yoshiaki Nunogaki, Nagaokakyo, Japan, assignor to Sanki Engineering, Ltd., Kyoto, Japan

Continuation of Ser. No. 120,313, Nov. 13, 1987, abandoned. This application Mar. 20, 1989, Ser. No. 326,498
Int. Cl.[4] B01D *15/08*
U.S. Cl. 210—198.2 2 Claims



1. A centrifugal counter-current distribution chromatographic apparatus comprising:

a centrifuge having a shaft, and a rotor rotatably mounted to and about the shaft, the shaft having a first fluid rotary coupling operatively connectable to a source of fluid samples and a second fluid rotary coupling, and the rotor having at least one pocket extending therein and spaced radially from the shaft; and

a cassette comprising at least one flat plate having opposite flat surfaces, a sealing plate covering each of said flat surfaces, and metallic side plates between which said at least one flat plate and each said sealing plate are clamped,

each said at least one flat plate having a plurality of elongate slots extending in and open to at least one of said flat surfaces and disposed adjacent one another on said at least one of said flat surfaces, and a respective groove extending in said at least one of said flat surfaces between each adjacent pair of said plurality of elongate slots,

each of said elongate slots extending parallel to one another and in a direction of elongation, from a first end thereof to a second end thereof, across said at least one of said flat surfaces,

said plurality of elongate slots spaced apart from one another on said at least one of said flat surfaces in a direction extending perpendicular to said direction of elongation,

each said respective groove open to the first end of one of a said adjacent pair of said elongate slots and the second end of the other of said adjacent pair of said elongate slots, and

a tortuous separation passage defined in said cassette along said elongate slots and each said respective groove from a first one of said elongate slots to a last one of said elongate slots,

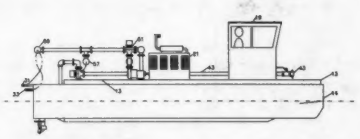
said cassette disposed in a said pocket of the rotor with said direction of elongation of each of said slots extending radially with respect to the shaft of the centrifuge, said direction in which said elongate slots are spaced from one another on said at least one of said flat surfaces extending parallel to the shaft of the centrifuge, the first ends of each of said elongate slots being disposed radially outward of the second ends thereof with respect to the shaft of the centrifuge, the first end of said first one of said elongate slots in fluid communication with the first rotary coupling of the shaft of the centrifuge, and the last one of said elongate slots in fluid communication with the second rotary coupling of the shaft of the centrifuge.

4,877,524

APPARATUS FOR TREATING BODIES OF WATER

Thomas E. Eberhardt, 20 Blenheim Dr., Easton, Pa. 18042

Division of Ser. No. 199,314, May 26, 1988, Pat. No. 4,818,416, which is a continuation-in-part of Ser. No. 75,114, Jul. 20, 1987, Pat. No. 4,747,958. This application Feb. 13, 1989, Ser. No. 310,208
Int. Cl.[4] A01G *7/00*; B63B *7/00*
U.S. Cl. 210—242.1 10 Claims



1. A floating treatment agent transport and application means comprising: means for transporting and applying fluent treatment agent to a body of water to correct a predetermined imbalance in the aquatic environment in such body of water including:

(a) a fluent treatment agent supply tank means arranged and constructed to be partially submerged in and at least in part supported by hydrostatic pressure on its outer surface,

(b) a working deck supported upon the tank means,

(c) at least two elongated pontoon means arranged and constructed to provide additional stability and flotation to the fluent treatment agent supply tank means when said tank means is loaded,

(d) fluent material dispensing means arranged and constructed for extending transversely from the transport means at least when in use in a pattern adapted to provide substantially uniform application of treatment agent to an extended portion of the body of water,

(e) propulsion means for said spray transport means,

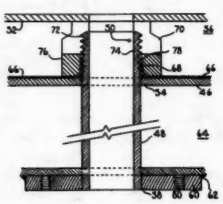
(f) extension means for extending the elongated pontoon means into additionally spaced stability engendering relationship with respect to the fluent treatment agent supply tank means while said transport means is operational.

4,877,525

PRESSURIZED VESSEL WITH FALSE BOTTOM AND THROUGHPIPE COATED AT WELD SITE

John W. Chapman, Boise, Id., assignor to Micron Technology Inc, Boise, Id.

Filed Oct. 24, 1988, Ser. No. 261,706
Int. Cl.[4] B01D *23/20*
U.S. Cl. 210—289 5 Claims



1. In an apparatus for the manufacture of deionized water comprising a pressurized vessel containing deionizing resin, an inner tank bottom and a lower tank dome defining an air space therebetween, the air space not in fluid communication with the deionized water or the deionizing resin, the improvement comprising:

(a) a throughpipe threadably engaged at an upper end to a

distribution header above the inner tank bottom, said throughpipe extending through the inner tank bottom, through the air space and thence through the lower tank dome, said throughpipe being welded at a weld site to the inner tank bottom; and

(b) a corrosion-resistant coating applied to the interior of the pressurized vessel and the inner tank bottom, and extending upwardly to cover the weld site and at least a portion of the throughpipe extending above the inner tank bottom; and

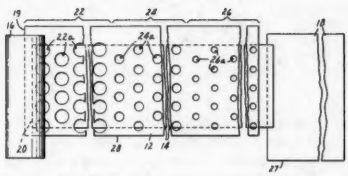
(c) seal means applied to the throughpipe between the distribution header and the corrosion-resistant coating applied to the inner tank bottom and covering an upper edge of the coating applied to the throughpipe.

4,877,526

FLEXIBLE FILTER BAG AND METHOD OF FABRICATION

Todd W. Johnson, and Corazon C. Brizuela, both of St. Paul, Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Aug. 31, 1987, Ser. No. 91,441
Int. Cl.[4] B01D *29/12*
U.S. Cl. 210—448 **24 Claims**



1. Flexible filter bag useful for filtering a fluid under pressure and comprising

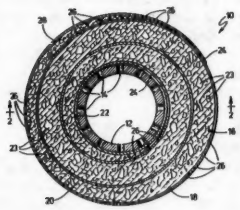
a strip of flexible filtering fabric having a longitudinal edge and wound upon itself in a large number of convolutions to provide a tube with said edge overlying itself, one end of the tube being secured to a structural ring to provide an open throat, and the ring-free end of the tube being sealed together to provide a flexible filter bag that has a seamless filter element and is open only at said ring.

4,877,527

LIQUID FILTER OF SPIRAL WOUND CONSTRUCTION WITH ALTERNATE LAYERS OF A SURFACE AREA MEDIA AND A DEPTH MEDIA

Peter Brownell, Providence, R.I., assignor to Allied-Signal Inc., Morristown, N.J.

Filed Jun. 15, 1987, Ser. No. 62,031
Int. Cl.[4] B01D *27/04*
U.S. Cl. 210—489 **11 Claims**



1. Liquid filter cartridge comprising a perforated centertube, and a filtering media wound circumferentially around said centertube, said filtering media comprising a depth type filtering medium between layers of a surface type filtering medium having a predetermined porosity placed on opposite sides of said depth type filtering medium, said depth type filtering medium being relatively uncompressed to have a strength sufficient to maintain separation between the layers of said surface type filtering medium on opposite sides of said depth type filtering medium, and having a porosity sufficiently great to permit relatively uninhibited flow of the liquid within the depth type filtering medium both radially and circumferentially with respect to said centertube, said surface type filtering medium having sections of greater porosity relative to said predetermined porosity, said sections of greater porosity being spaced circumferentially from one another whereby said sections of greater porosity are offset radially from one another on adjacent layers of said surface type filtering medium.

4,877,528

SILOXANE-GRAFTED MEMBRANES

Dwayne T. Friesen, Bend, Oreg., and Alan S. Obligin, Catonville, Md., assignors to Bend Research, Inc., Bend, Oreg.

Filed Oct. 27, 1988, Ser. No. 263,062
Int. Cl.[4] B01D *13/00*
U.S. Cl. 210—500.29 **7 Claims**

1. A siloxane-grafted cellulosic semipermeable composite membrane comprising chemical structure for providing a substantially constant flux as a function of time, consisting essentially of non-crosslinked covalently bonded reaction product of hydroxyl-reactive functional groups of a polysiloxane with hydroxyl groups of an asymetric cellulosic semipermeable membrane, wherein said hydroxyl-reactive functional groups are selected from acid halides, aminoacid halides, sulfonyl halides, and phosphoryl halides.

4,877,529

SEPARATION OF ORGANIC LIQUIDS

Mordechai Pasternak, Spring Valley; Craig R. Bartels, and John Reale, Jr., both of Wappinger Falls, all of N.Y., assignors to Texaco Inc., White Plains, N.Y.

Division of Ser. No. 166,575, Mar. 10, 1988, Pat. No. 4,798,674. This application Jul. 22, 1988, Ser. No. 222,871
Int. Cl.[4] B01D *13/00*
U.S. Cl. 210—500.37 **4 Claims**

1. A non-porous ion exchange membrane comprising A molecular structure enabling concentration of a charge solution containing (i) an alcohol having less than three carbon atoms and (ii) an oxygenate selected from the group consisting of organic ethers, aldehydes, ketones, and esters, including a high molecular weight perfluorinated non-porous ion exchange acid resin in membrane form having carbon atoms in the backbone, bearing a pendant acid group, said membrane having been contacted with a quaternary ammonium salt containing hydrocarbyl groups each of which contains less than four carbon atoms.

4,877,530

LIQUID CO_2/COSOLVENT EXTRACTION

John M. Moses, Dedham, Mass., assignor to CF Systems Corporation, Waltham, Mass.

Division of Ser. No. 603,563, Apr. 25, 1984, Pat. No. 4,770,780. This application Feb. 29, 1988, Ser. No. 161,999
The portion of the term of this patent subsequent to Sep. 13, 2005, has been disclaimed.
Int. Cl.[4] B01D *11/04*
U.S. Cl. 210—511 **5 Claims**

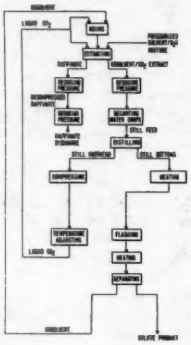
1. A quaternary fluid extraction system comprising:

water as a first component of said system;

an organic solute as a second component of said system;

a fluid extractant formed of the third and fourth components of said system, said fluid extractant comprising a mixture of liquid carbon dioxide as said third component and a monofunctional hydrocarbon cosolvent said fourth component, which cosolvent is a liquid at about 60° C. and

standard pressure; is a substantially better solvent for the liquid solute than for the water; has a solubility in liquid carbon dioxide greater than 1 weight percent than under the conditions of extraction and separation, the carbon dioxide/cosolvent mixture forms a single phase; in the



absence of solute, has a distribution coefficient (carbon dioxide/water) of greater than 3 on a weight basis; has a boiling point substantially above or below that of the liquid solute at atmospheric pressure; and is substantially chemically unreactive under process conditions with the first solvent fluid, the liquid solute and water.

4,877,531

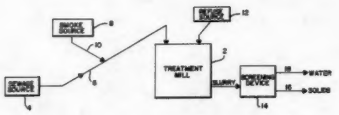
PROCESS FOR TREATING VARIOUS REFUSE MATERIALS, PARTICULARLY SMOKE, GARBAGE AND SEWAGE

Albert L. Burkett, 3984 N. Roger La., Tucson, Ariz. 85719

Filed Nov. 7, 1988, Ser. No. 268,199

Int. Cl.[4] B01D *53/34*; C02F *3/02*

U.S. Cl. 210—620 **4 Claims**



1. A process for treating solid, liquid and gaseous refuse materials, comprising the steps of:

(a) injecting a gaseous refuse material including smoke into a conduit carrying a generally liquid refuse material including raw sewage thereby forming a first mixture;

(b) pouring said first mixture into a treatment mill and adding a generally solid refuse material including cellulose thereto for forming a second mixture;

(c) aerobically digesting said second mixture by operating said treatment mill for a period of time sufficient to form a pumpable slurry; and

(d) processing said slurry to separate the solids from the aqueous solution.

4,877,532

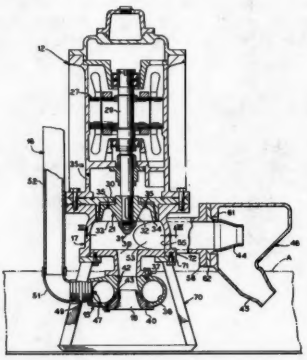
CENTRIFUGAL OXYGENATOR AND METHOD FOR TREATMENT OF WASTE WATER

Walter D. Haentjens, and Thomas E. Stirling, both of Sugarloaf, Pa., assignors to Barrett, Haentjens & Company, Hazelton, Pa.

Continuation of Ser. No. 903,506, Sep. 4, 1986, abandoned. This application Sep. 23, 1987, Ser. No. 100,107

Int. Cl.[4] C02F *3/26*

U.S. Cl. 210—629 **13 Claims**



1. An apparatus for effecting the absorption of oxygen by a biodegradable waste in a continuous operation, comprising: a pump having a impeller, means for rotatably driving said impeller, a collector enclosing said impeller and creating a relatively large volume chamber mismatched relative to said impeller, a first inlet in fluid communication with a source of biodegradable waste and disposed in said collector axially of said impeller, a second inlet in fluid communication with a source of air including oxygen and extending around said first inlet for biodegradable waste, said first and second inlets cooperating with a vortex created by said impeller to effect agitation of air and biodegradable waste entering said collector, and an outlet leading from said collector in fluid communication with a means for providing increased back pressure in said collector and forming, in cooperation with said first and second inlets and said impeller, means for impeding axial flow of said biodegradable waste through said outlet by increasing the dwell time of said biodegradable waste in said collector to effect a thorough absorption of oxygen from the air and particle break-up of the biodegradable waste prior to discharge through said outlet.

4,877,533

SEPARATION OF WATER FROM ORGANIC FLUIDS

Ian G. Meldrum, Leatherhead, and Timothy d. Naylor, Woking, both of England, assignors to British Petroleum Company p.l.c., London, England

Continuation of Ser. No. 841,531, Feb. 27, 1986, abandoned. This application Dec. 29, 1987, Ser. No. 140,908

Claims priority, application United Kingdom, Jul. 27, 1984, 8419174

Int. Cl.[4] B01D *13/00*

U.S. Cl. 210—640 **17 Claims**

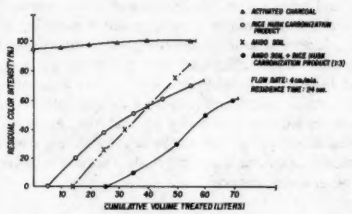
1. The process for separating water from a mixture with a less hydrophilic fluid by bringing the mixture into contact with one side of a membrane and removing the water as vapour from the other side of the membrane wherein the membrane has an active layer which consists essentially of homopolymers of an unsaturated organic acid having acid groups in a free acid form and acid groups in a salt form, the acid having no more than 6 carbon atoms for every acid group, not counting any

carbon atoms in the acid group, and the homopolymer having at least 50% of the acid groups in a salt form.

4,877,534
ADSORBENT FOR REMOVING WATER- OR AIR-BORNE CONTAMINANTS

Konosuke Nishida, Kurita; Mitsue Hada, Ibaragi, and Shozo Hiki, Kobe, all of Japan, assignors to Konosuke Nishida, Shiga; Mitsue Hada, Osaka and Hanshim Kikagaku Kabushiki Kaisha, Nishinomiya, all of, Japan

Filed Apr. 29, 1988, Ser. No. 188,503
Claims priority, application Japan, Oct. 14, 1987, 62-260463
Int. Cl.[4] B01D *15/04*
U.S. Cl. 210—691 **10 Claims**


ACTIVATED CHARCOAL
RICE HUSK CARBONIZATION PRODUCT
ANDO SOIL
ANDO SOIL + RICE HUSK CARBONIZATION PRODUCT (1:1)
FLOW RATE: 4 cm/min.
RESIDENCE TIME: 24 sec.
RESIDUAL COLOR INTENSITY (%)
CUMULATIVE VOLUME TREATED (LITERS)

1. A method for removing contaminants from air or water, comprising:

passing a fluid to be treated through an adsorbent mainly comprising a mixture of at least one soil selected from the group consisting of Ando soil and loamy soil, and carbonized plant material containing amounts of organic substances sufficient to serve as nutrient sources for the growth of microorganisms that degrade the contaminants.

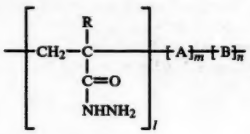
4,877,535
IRON DISPERSANT FOR BOILER WATER

Kenji Kobayashi, Yokohama; Ichiro Kaneko, Machida; Masahiro Kobayashi, and Shinji Nakano, both of Tokushima, all of Japan, assignors to Kurita Water Industries, Ltd., Tokyo and Otsuka Chemical Co., Ltd., Osaka, both of, Japan

Continuation of Ser. No. 565, Jan. 5, 1987, abandoned. This application Aug. 26, 1988, Ser. No. 237,647
Claims priority, application Japan, Jan. 13, 1986, 61-4806
Int. Cl.[4] C02F *5/12*
U.S. Cl. 210—701 **16 Claims**

1. A composition used to disperse iron in boiler water comprising:

(a) a first component which is an acrylic copolymer having repeating unit:



(I)

wherein R represents hydrogen or a methyl group; A is a repeating unit representing acrylamide, methacrylamide, acrylic alkyl ester or methacrylic alkyl ester; B is a repeating unit representing acrylic acid, acrylate, methacrylic acid, methacrylate or a monomer copolymerizable with the repeating unit A; l represents a molecular percentage of repeating units of the first component of $10 \leqq l \leqq 70$; m represents a molecular percentage of repeating units of the first component of $10 \leqq m \leqq 90$; and n represents a molecular percentage of repeating units of the first component of $0 \leqq n \leqq 50$, the sum of the molecular percentage of repeating units of l, m and n being 100; and

(b) a second component of at least one of a homopolymer or a copolymer of one of an acrylate or a methacrylate, wherein said second component and said first component are present in the composition in a range from 9:1 to 1:9 by weight of each of the components.

13. A process for dispersing iron in boiler water comprising:

adding a composition to the water in an amount ranging from 0.01 to 10 mg composition to each liter of water, the composition having a first component which is an acrylic copolymer having repeating unit:

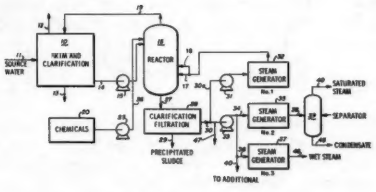
(I)

wherein R represents hydrogen or a methyl group; A is a repeating unit representing acrylamide, methacrylamide, acrylic alkyl ester or methacrylic alkyl ester; B is a repeating unit representing acrylic acid, acrylate, methacrylic acid, methacrylate or a monomer copolymerizable with the repeating unit A; l represents a molecular percentage of repeating units of the component of $10 \leqq l \leqq 70$; m represents a molecular percentage of repeating units of the component of $10 \leqq m \leqq 90$; and n represents a molecular percentage of repeating units of the component of $0 \leqq n \leqq 50$, the sum of the molecular percentage of repeating units of l, m and n being 100; and a second component of at least one of a homopolymer or a copolymer consisting of one of an acrylate or a methacrylate, wherein said second component and said first component are present in the composition in a range from 9:1 to 1:9 by weight of each of the components to thereby prevent formation of iron oxide deposits in the boiler water.

4,877,536
METHOD OF TREATING SALINE WATER

Theodore A. Bertness, Whittier, and Samuel P. Lipoma, Delano, both of Calif., assignors to Bertness Enterprises, Inc., Sioux City, Iowa

Continuation of Ser. No. 922,681, Oct. 24, 1986, abandoned, which is a continuation of Ser. No. 434,062, Oct. 13, 1982, abandoned, which is a continuation-in-part of Ser. No. 256,719, Apr. 23, 1981, abandoned. This application Dec. 14, 1987, Ser. No. 132,360
Int. Cl.[4] C02F *1/52, 1/66*
U.S. Cl. 210—712 **6 Claims**



1. A method of treating hard water produced with petroleum from an oil well or oil wells which comprises, after separation of the hard water from the bulk of the oil, the following steps

(a) introducing the separated, hard water into a reaction zone;

(b) generating steam in a steam boiler from a separate supply of soft water;

(c) introducing such steam directly into the hard water in such reaction zone in quantity and at a temperature and pressure sufficient to heat the hard water to the range of about 350° to 450° F. and to precipitate the hardness in the form of sludge, the quantity of steam so introduced being insufficient to evaporate more than a small amount of the hard water introduced into the reaction zone in step (a), thereby resulting in softened water as the principal product of step (c) and also producing sludge;

(d) venting steam from the reaction zone together with non-aqueous volatile substances including carbon dioxide dissolved in the hard water introduced into the reaction zone and/or resulting from thermal decomposition of carbonates and/or bicarbonates in the reaction zone, together with such volatile hydrocarbon constituents of the hard water as may be introduced into the reaction zone;

(e) separating sludge formed in step (c) from softened water produced in step (c), and

(f) withdrawing from the system softened water as the major product.

4,877,537

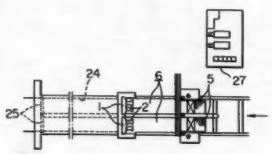
PUMPING SYSTEM FOR GATES

Ichiji Kobayashi, and Motohide Sakata, both of Saga, Japan, assignors to Mizota Industrial Co., Ltd., Japan

Filed Oct. 4, 1988, Ser. No. 253,197

Int. Cl.[4] B01D *33/00*

U.S. Cl. 210—747 **4 Claims**



1. A method of providing a pumping system for gates comprising the steps of forming a sluice body which is liftably received at its both sides witin the guide grooves formed in the side walls of a water channel; mounting a plurality of pumps in parallel with each other with the suction ports of said pumps being located at the upstream side of said water channel and also being opened towards the bottom therof, and with the discharge ports of said pumps being located at the downstream side of said water channel; mounting a debris collecting device in the upstream side of said water channel on lift means so as to be liftable over said water channel; and lowering said sluice body at the time of lowering said debris collecting device, while raising said sluice body at the time of raising said debris collecting device.

4,877,538

SULFOMETHYLATED STAIN BLOCKING AGENTS

Alexander S. Kirjanov, Reading, Pa., and Michel A. Herlant, Mount Pleasant, N.C., assignors to Crompton & Knowles Corporation, Stamford, Conn.

Filed Apr. 4, 1988, Ser. No. 177,110

Int. Cl.[4] D06M *00/00*

U.S. Cl. 252—8.7 **19 Claims**

1. A stain blocking composition comprising 1–50 parts a sulfomethylated phenol-formaldehyde or sulfomethylated naphthol-formaldehyde and an 1 part of an anionic surface active agent.

4,877,539

TEXTILE TREATMENT PREPARATIONS CONTAINING A FATTY ACID AND HYDROXYALKYL-AMINE CONDENSATE PREPARED IN THE PRESENCE OF DISPERSION ACCELERATOR

Uwe Ploog, Haan, and Guenter Uphues, Monheim, both of Fed. Rep. of Germany, assignors to Henkel Kommanditgesellschaft auf Aktien, Duesseldorf, Fed. Rep. of Germany

Filed Sep. 13, 1988, Ser. No. 243,956

Claims priority, application Fed. Rep. of Germany, Sep. 14, 1987, 3730792

Int. Cl.[4] C11D *1/52, 3/20;* D06M *13/40*

U.S. Cl. 252—8.8 **20 Claims**

1. A textile treatment preparation obtained by condensation reaction of (a) an aliphatic C_8–C_{22} monocarboxylic acid or amideforming derivative thereof with (b) a hydroxyalkyl polyamine and subsequent neutralization of unreacted amino groups, the fabric treatment preparation containing a dispersion accelerator selected from the group consisting of aldose and ketose monosaccharides and polyhydroxy compounds derived therefrom by hydrogenation; a polyol; an alkylglucoside; a sorbitan ester; and a neutral or synthetic hydrophilic polymer, in sufficient quantity so that the textile treatment preparation is rapidly dispersible in cold water, wherein said dispersion accelerator is present in the reaction mixture during the condensation reaction.

4,877,540

METHYLOLATED AND OPTIONALLY ETHERIFIED URETHANES CONTAINING FLUOROALKYL LIGANDS

Fritz Engelhardt; Karl Hintermeier, both of Frankfurt am Main; Manfred Müller, Geinhausen; Norbert Münch, Kelkheim, and Hans Wagener, Hofheim, all of Fed. Rep. of Germany, assignors to Cassella Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

Filed Aug. 8, 1988, Ser. No. 229,509

Claims priority, application Fed. Rep. of Germany, Aug. 19, 1987, 3727665

Int. Cl.[4] C07C *125/06, 127/24, 143/74;* D06M *15/57*

U.S. Cl. 252—8.75 **15 Claims**

1. Methylolated urethane containing fluoroalkyl ligands prepared by methylolation of a urethane reactant of the formula

$$(R_f\text{—}(SO_2NR^1)_a(CH_2)_x\text{—}O\text{—}(CH_2\text{—}\underset{\displaystyle Y}{\underset{|}{CH}}\text{—}O)_m\text{—}CO\text{—}NH)_p\text{—}R$$

with formaldehyde in a molar ratio of 0.5 to (1.1)t moles urethane reactant per mole formaldehyde wherein

R_f denotes perfluoroalkyl with 4 to 20 carbon atoms;

R^1 denotes hydrogen or an alkyl with 1 to 4 carbon atoms;

a denotes the number 0 to 1;

x denotes a number from 1 to 4;

Y denotes hydrogen, —CH_3 or —CH_2Cl;

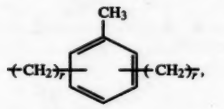
R denotes

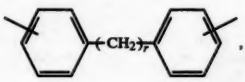
$+CH_2\rangle_q$,

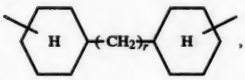
$+CH_2\rangle_q O+CH_2\rangle_q$,

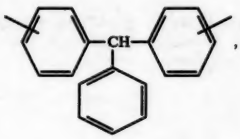
$+CH_2\rangle_q NH+CH_2\rangle_q$,

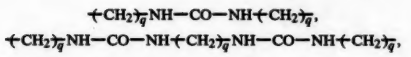
-continued

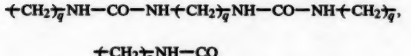


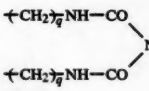


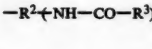




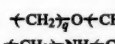


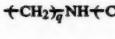


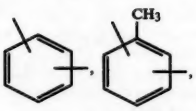


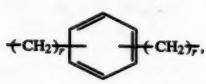


p denotes a number from 1 to 4;
q denotes a number from 2 to 10;
r denotes a number from 1 to 6;
m denotes a number from 0 to 4;
w denotes a number from 1 to 2, with the proviso that the sum of p+w is not more than 3;
R^2 denotes a (p+w)-valent radical selected from the group









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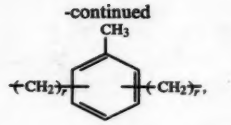
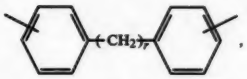
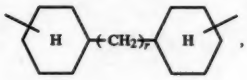
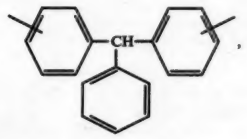
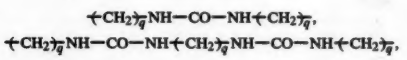
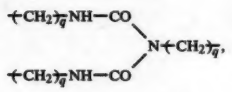


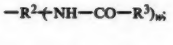




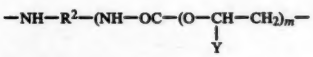


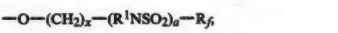


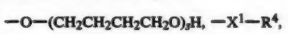




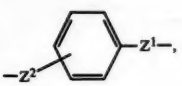
R^3 denotes

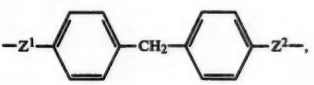


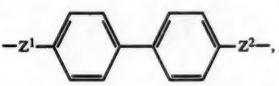


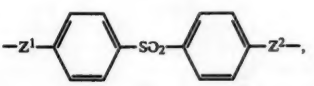


or the radical of a CH-acid or NH-acid compound;
s denotes a number from 1 to 15,
X^1 denotes









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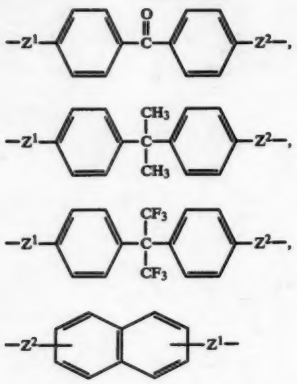
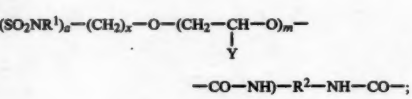


whereby all X^1 radicals can be mono- or polysubstituted by alkyl groups with 1 to 4 C atoms;

Z^1, Z^2 which are identical or different denote —O— or —NH—;

R^4 denotes the hydrogen atom, an alkyl group with 1 to 4 C atoms or the group



and t is the total number of methylolatable —NH groups in the urethane reactant.

4,877,541

CORROSION INHIBITOR

Max J. Wisotsky, Highland Park, N.J., and Stephen J. Metro, Pinehurst, N.C., assignors to Exxon Research and Engineering Company, Florham Park, N.J.

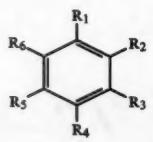
Filed Dec. 11, 1987, Ser. No. 131,993

Int. Cl.[4] C10M *133/16*

U.S. Cl. 252—47.5 **29 Claims**

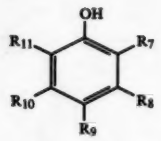
1. A corrosion inhibitor for metal surfaces comprising:

I. A compound having the formula:



wherein R_1 is an amide, substituted amide or an ester; at least one substituent of R_2, R_3, R_4, R_5 and R_6 is an amide, substituted amide, amine or substituted amine; and the remaining substituents are independently hydrodgen, hydroxyl or alkyl; and

II A compound having the formula



wherein at least one substituent of R_7–R_{11} is an alkanoyl radical having the structure

where R12 is alkyl, X is O, N or S; and the remaining R_7–R_{11} substituents are hydrogen, alkyl, hydroxy, or ether functionality.

4,877,542

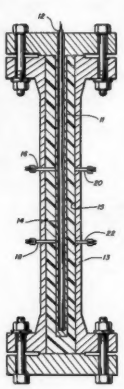
THERMAL INSULATING FLUID

Jesus R. Lón; Olegario Rivas, and Geza N. Zirczy, all of Caracas, Venezuela, assignors to Intevep, S. A., Caracas, Venezuela

Filed May 10, 1988, Ser. No. 192,194

Int. Cl.[4] E04B *1/76*; E21B *36/00*

U.S. Cl. 252—62 **13 Claims**



1. A thixotropic thermal insulating fluid consisting essentially of:

(a) a heavy oil having an API gravity of not more than 15° and a water content of not more than about 5% by volume present at a concentration of about 85% to about 95% by volume of the liquid portion of said insulating fluid;

(b) a light oil having an API gravity of at least about 20° and present at a concentration of about 5 to about 15% by volume of the liquid portion of said insulating fluid;

(c) a smectite-type clay in an amount of about 1 to about 5% by weight of said fluid;

(d) calcium oxide in an amount of about 0.75% to about 5% by weight of said insulating fluid; and

(e) hydrated amorphous sodium silicate, with a SiO_2Na_2O modulus ratio of about 3 to about 4, present in an amount of about 1 to about 2% by weight of said insulating fluid.

4,877,543

LOW LOSS OXIDE MAGNETIC MATERIAL

Hikohiro Togane, Sagaminara, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 207,641, Jun. 16, 1988. This application Mar. 29, 1989, Ser. No. 330,284

Claims priority, application Japan, Jun. 19, 1987, 62-152858

Int. Cl.[4] C04B 35/26

U.S. Cl. 252—62.64 2 Claims

1. A ferrite magnetic material exhibiting low power loss for use as a deflector yoke core for a high speed scanning cathode ray tube, consisting essentially of 43–47 mol % of Fe_2O_3, 27–35 mol % of MgO, 13–20 mol % of ZnO, 3–10 mol % of MnO and Bi_2O_3 in an amount of from about 0.1 to 1.5 wt. %.

4,877,544

OXIDATION STABLE SURFACTANTS

Robert Gabriel, Maplewood, N.J.; Michael P. Aronson, West Nyack, N.Y., and Peter L. Steyn, West Caldwell, N.J., assignors to Lever Brothers Company, New York, N.Y.

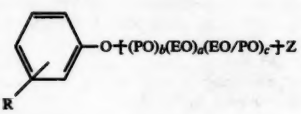
Continuation-in-part of Ser. No. 40,386, Apr. 17, 1987, abandoned. This application Apr. 14, 1988, Ser. No. 183,512

Int. Cl.[4] C11D 1/722, 3/395

U.S. Cl. 252—99 18 Claims

1. Detergent compositions comprising:

(i) from about 0.1 to about 15% of a nonionic surfactant identified by formula I:



I

wherein

R is an alkyl group containing from 8 to about 12 carbon atoms;

EO and PO represent oxyethylene and oxypropylene groups, respectively;

a, b and c may each range from 0 to about 10, with the sum of a, b and c ranging from about 6 to about 12;

the ratio of EO to PO is at least 1 but no higher than about 2; and

Z is selected from methyl or chloroethyl groups and said group is attached to an oxyethylene unit at an oxygen atom thereof;

(ii) from about 0.5 to about 10% of an oxidizing agent selected from hypochlorite and hydrogen peroxide generating compounds; and

(iii) from about 0 to about 80% of a builder.

4,877,545

AZEOTROPIC COMPOSITIONS OF 1,1,2-TRICHLOROTRIFLUOROETHANE AND TRANS-1,2-DICHLOROETHYLENE WITH ETHANOL, N-PROPANOL, ISOPROPANOL AND ACETONE OR WITH ETHANOL OR ACETONE AND NITROMETHANE

Abid N. Merchant, Wilmington; Robert A. Gorski, Newark, both of Del., and Kenneth C. Burke, Westfield, N.J., assignors to E. I. Du Pont De Nemours and Company, Wilmington, Del.

Filed Dec. 29, 1988, Ser. No. 291,791

Int. Cl.[4] C11D 7/50, 7/30

U.S. Cl. 252—171 26 Claims

1. An azeotrope or azeotrope-like composition comprising consisting essentially of from about 58–77 weight percent 1,1,2-trichlorotrifluorethane, about 17–39 weight percent trans-1,2-dichloroethylene and an oxygenated compound selected from the group consisting of about 2–5 weight percent ethanol, about 0.1–2.0 weight percent n-propanol, about 1–5 weight percent isopropanol and about 4–8 weight percent acetone wherein the composition has a boiling point of about 42.6°–44.2° C., at 760 mm Hg.

17. An azeotrope or azeotrope-like composition comprising consisting essentially of from about 58–77 weight percent 1,1,2- trichlorotrifluoroethane, about 17–39 weight percent trans- 1,2-dichloroethylene, about 0.01–1.0 weight percent nitromethane and an oxygenated compound selected from the group consisting of about 2–5 weight percent ethanol or about 4–8 weight percent acetone wherein the composition has a boiling point of about 42.6–44.2° C., at 760 mm Hg.

4,877,546

FOAM ENHANCING AGENT FOR LIGHT DUTY DETERGENT

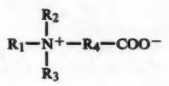
Kuo-Yann Lai, Kendall, N.J., assignor to Colgate-Palmolive Company, Piscataway, N.J.

Continuation of Ser. No. 858,827, Apr. 29, 1986, abandoned, which is a continuation of Ser. No. 573,434, Jan. 24, 1984, abandoned, which is a continuation of Ser. No. 290,640, Aug. 6, 1981, abandoned. This application Oct. 30, 1987, Ser. No. 117,380

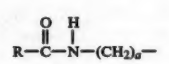
Int. Cl.[4] C11D 3/22

U.S. Cl. 252—174.17 4 Claims

1. A light duty, liquid detergent composition in an aqueous solution consisting essentially of: (a) 0.1% to 1.0% by weight of a nonionic hydroxypropyl guar gum derivative; and (b) a ternary mixture of a water-soluble salt of an anionic C_8–C_{18} alkyl ethenoxy ether sulfate containing 1 to 12 ethenoxy groups in the molecule, a water-soluble salt of a C_8–C_{18} alkyl sulfate surfactant, the weight ratio of said alkyl sulfate to said alkyl ethenoxy ether sulfate being from 1:29 to 29:1, and a zwitterionic betaine surfactant of the formula:



wherein R_1 is an alkyl group having 10 to 20 carbon atoms or the amido radical



wherein R is an alkyl group having 9 to 19 carbon atoms and a is an integer from 1 to 4; R_2 and R_3 are C_1–C_3 alkyl; and R_4 is an alkylene or hydroxyalkylene group having 1 to 4 carbon atoms, said ternary mixture being present in an amount of approximately 20% to 40% by weight of the composition with said betaine constituting 2% to 5% by weight of the composition, said composition having a viscosity of from at least 100 cps. to 1000 cps. at room temperature and exhibiting enhanced foaming properties as compared with the same composition without said nonionic guar gum.

4,877,547

LIQUID CRYSTAL DISPLAY ELEMENT

Georg Weber, Erzhausen, Fed. Rep. of Germany; Bernhard Scheuble, Yokohama, Japan, and Joachim Krause, Dieburg, Fed. Rep. of Germany, assignors to Merck Patent Gesellschaft mit Beschränkter Haftung, Darmstadt, Fed. Rep. of Germany

PCT No. PCT/EP87/00078, § 371 Date Oct. 23, 1987, § 102(e) Date Oct. 23, 1987, PCT Pub. No. WO87/05317, PCT Pub. Date Sep. 11, 1987

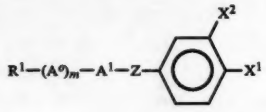
PCT Filed Feb. 14, 1987, Ser. No. 124,791

Claims priority, application Fed. Rep. of Germany, Feb. 26, 1986, 3606153

Int. Cl.[4] G02F *1/13*; G09F *9/35*; C09K *19/42, 19/08, 19/30/19/20, 19/34*

U.S. Cl. 252—299.61 7 Claims

1. A liquid crystal display element with static or multiplex control with a low multiplex ratio and an operating voltage below 3.3 volts, containing a liquid crystal dielectric, wherein the operating temperature range extends from −30° C. to +80° C. and the viscosity of the dielectric at 20 ° C. is less than 40 mPa.s, wherein the dielectric contains at least one component of the formula I



I

wherein

R^1 is alkyl with 1 to 12 C atoms, wherein one or two non-adjacent CH_2 groups can also be replaced by O atoms, —CO—, —O—CO—, —CO—O— and/or —CH=CH— groups,

A^o and A^1 each independently of one another are Cy, Dio or Phe,

Z is $—CH_2—O—$, $—O—CH_2$ or a single bond,

X^1 is F, Cl, —CN or —NCS,

X^2 is F, Cl and, in the case where X^1=NCS, also H,

m is 0 or 1,

Cy is trans-1,4-cyclohexylene,

Dio is trans-1,3-dioxane-2,5-diyl and

Phe is 1,4-phenylene which is unsubstituted or substituted by fluorine.

4,877,548

LIQUID CRYSTAL COMPOSITION

Kisei Kitano, Chiba; Makoto Ushioda; Manabu Uchida, both of Ichihara, and Toshiharu Suzuki, Ichihara, all of Japan, assignors to Chisso Corporation, Japan

Filed Dec. 27, 1988, Ser. No. 290,701

Claims priority, application Japan, Dec. 28, 1987, 62-335984; Jun. 3, 1988, 63-136820

Int. Cl.[4] G02F *1/13*; C09K *19/30, 19/12*; C07C *21/24*

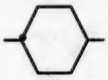
U.S. Cl. 252—299.63 16 Claims

1. A compound expressed by the formula

$$R^1—A^1—B^1—A^2—B^2—A^3)_n(CH_2)_mCH=CF_2$$

wherein R^1 represents a hydrogen atom or an alkyl group or an alkenyl group each of 1 to 20 carbon atoms wherein one $—CH_2—$ group or two $—CH_2—$ groups not adjacent to each other may be substituted by a —O— group; the position and number of said double bond may be optionally chosen; A^1, A^2 and A^3 each independently represent

or



and the hydrogen of this

may be substituted by fluorine, chlorine or methyl; B^1 And B^2 each independently represent $—CH_2CH_2—$, $—CH_2O—$, $—OCH_2—$ or a single bond; n represents an integer of 0 or 1; and m represents an integer of 0 to 20.

4,877,549

LIQUID CRYSTAL COMPOSITION

Shinichi Sawada, Ichiharashi; Tetsuya Matsushita, Yokohama-shi, and Toyoshiro Isoyama, Ichiharashi, all of Japan, assignors to Chisso Corporation, Japan

Filed Feb. 25, 1988, Ser. No. 160,188

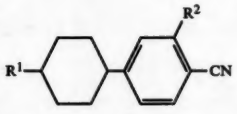
Claims priority, application Japan, Mar. 3, 1987, 62-48099

Int. Cl.[4] G02F *1/13*; C09K *19/30*

U.S. Cl. 252—299.63 4 Claims

1. A liquid crystal composition usable in a supertwisted birefringence effect display, comprising:

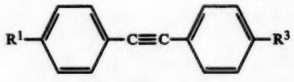
(a) 20 to 40% by weight of a first component consisting of at least one compound expressed by the general formula:



(I)

wherein R is an alkyl group of 1 to 8 carbon atoms; and R^2 is a hydrogen atom or a fluorine atom;

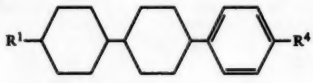
(b) 10 to 40% by weight second component consisting of at least one compound expressed by the general formula:



(II)

wherein R^1 is defined above; and R^3 is an alkyl group or an alkoxy group each of 1 to 8 carbon atoms; and

(c) 20 to 50% by weight third component consisting of at least one compound expressed by the general formula:



(III)

wherein R^1 is as defined above; and R^4 is a fluorine atom, a cyano group, or an alkyl group or an alkoxy group each of 1 to 8 carbon atoms;

said first, second and third components being contained in a total amount of 70% by weight or more in said composition.

4,877,550

SYNTHESIS GAS PREPARATION AND CATALYST THEREFOR

Duane A. Goetsch, and Geoffrey R. Say, both of Baton Rouge, La., assignors to Exxon Research and Engineering Company, Florham Park, N.J.

Continuation-in-part of Ser. No. 174,173, Mar. 28, 1988, abandoned. This application Jan. 9, 1989, Ser. No. 294,854

Int. Cl.[4] C01B *3/30*

U.S. Cl. 252—373 10 Claims

1. In a process for the production of a hydrogen and carbon monoxide containing synthesis gas which comprises

(i) reacting in a fluidized reaction zone a light hydrocarbon feed with steam and oxygen at elevated temperature in the presence of catalyst containing nickel on a support,

(ii) recovering a product gas comprised of carbon monoxide, hydrogen and entrained catalyst, and

(iii) cooling in a cooling zone the product gas to a temperature below that which favors the reaction of carbon monoxide and hydrogen to form methane in the presence of entrained catalyst;

THE IMPROVEMENT WHICH COMPRISES

(a) cooling the product gas rapidly by indirect means with boiling water forming high pressure steam and at a rate sufficient to preserve at least about 85% of the feed converted to hydrogen and carbon monoxide as hydrogen and carbon monoxide;

(b) recovering high pressure steam from the cooling zone; and

(c) preheating the light hydrocarbon feed with at least a portion of the steam recovered from the cooling zone.

4,877,551

AQUEOUS SUSPENSION OF DELAMINATED VERMICULITE

Alexander Lukacs, III, Wilmington, Del., assignor to Hercules Incorporated, Wilmington, Del.

Filed Aug. 22, 1988, Ser. No. 234,782

Int. Cl.[4] C04B *20/06*

U.S. Cl. 252—378 R 18 Claims

1. In a polymerizable composition comprising vermiculite platelets that have been deposited from an aqueous suspension, wherein the improvement comprises the platelets being ionically bonded to radical or ionically polymerizable organo-substituted onium ions.

4,877,552

CORROSION INHIBITOR

Ulrich Häring, Riehen, Switzerland, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed Aug. 28, 1987, Ser. No. 91,156

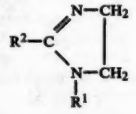
Claims priority, application Switzerland, Sep. 2, 1986, 3514/86

Int. Cl.[4] C23F *11/10*

U.S. Cl. 252—392 19 Claims

1. A corrosion inhibitor comprising

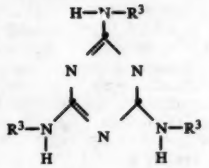
(a) an imidazoline of the formula I



(I)

in which R^1 is hydrogen, C_1–C_6-hydroxyalkyl, C_1–C_6-aminoalkyl or C_2–C_{19}-carboxyalkyl or an ammonia or amine salt thereof and R^2 is hydrogen, C_1–C_{17}-alkyl or C_2–C_{17}-alkenyl,

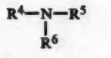
(b) a heterocyclic polyacid of the formula II



(II)

in which R^3 is C_4–C_6-carboxyalkyl or an alkali metal, alkaline earth metal, ammonium or amine salt thereof,

(c) at least one alkanolamine of the formula III



(III)

in which R^4 is C_1–C_6-hydroxyalkyl and R^5 and R^6, which can be identical or different, are hydrogen, C_1–C_6-alkyl or C_1–C_6-hydroxyalkyl, and

(d) water, wherein the ratio a:e (with b+c+d=e) is 1:1 up to 1:80.

4,877,553

GAS MANTLE TECHNOLOGY

Walter J. Diederich, West Newbury, Mass., assignor to TPV Energy Systems, Inc., Waltham, Mass.

Filed Jun. 6, 1988, Ser. No. 203,312

Int. Cl.[4] F21H *1/02*

U.S. Cl. 252—492 18 Claims

13. A gas mantle that has an operating color temperature of about 2300° K., said mantle being a self-supporting fabric-like structure and consisting essentially of from about one percent to ten percent by weight of ceria and from about ninety percent to ninety-nine percent by weight of erbia.

4,877,554

RESISTANCE PASTE

Kanehito Honma, Nagaokakyo; Tsutomu Yokoi, Suita, and Hiroji Tani, Nagaokakyo, all of Japan, assignors to Murata Manufacturing Co., Ltd., Japan

Filed Jul. 21, 1988, Ser. No. 222,280

Claims priority, application Japan, Jul. 22, 1987, 62-182995

Int. Cl.[4] H01B *1/06*

U.S. Cl. 252—511 14 Claims

1. Resistance paste comprising 5 to 70 weight % conductive powder suspended in 20–80 weight % thermosetting binder resin, in which said conductive powder comprises graphite powder particles having a diameter of not more than 20μm and coated with at least one fatty acid having at least 12 carbon atoms.

12. The resistance paste according to claim 11 wherein said conductive powder is graphite.

4,877,555

CONDUCTOR COMPOSITION AND METHOD OF MANUFACTURING A CERAMIC MULTILAYER STRUCTURE USING THE SAME

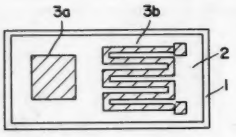
Satoru Yuhaku, Osaka; Seiichi Nakatani, Hirakata, and Tutomu Nishimura, Uji, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Apr. 13, 1988, Ser. No. 180,899

Claims priority, application Japan, Apr. 13, 1987, 62-90225; Apr. 13, 1987, 62-90227; Apr. 13, 1987, 62-90238

Int. Cl.[4] H01B *1/06*

U.S. Cl. 252—512 3 Claims



1. A conductor composition comprising an inorganic component and a vehicle, wherein said inorganic component comprises 85 to 95 wt. % of CuO and 15 to 5 wt. % of Cu.

4,877,556

CLEANING COMPOSITIONS CONTAINING AN ALCOHOL AND FATTY ACID ESTER AND THEIR USE IN THE PRETREATMENT OF FABRICS

Heinz-Manfred Wilsberg, Cologne, and Rolf Puchta, Haan, both of Fed. Rep. of Germany, assignors to Henkel Kommanditgesellschaft auf Aktien, Duesseldorf, Fed. Rep. of Germany

Continuation of Ser. No. 80,118, Jul. 31, 1987, abandoned. This application Nov. 15, 1988, Ser. No. 274,634

Claims priority, application Fed. Rep. of Germany, Aug. 2, 1986, 3626224

Int. Cl.[4] C11D *1/44, 1/875, 3/43*

U.S. Cl. 252—544 10 Claims

1. A cleaning composition consisting essentially of

(a) from about 2 to about 30% by weight of at least one C_{10}–C_{20} fatty alcohol and/or oxoalcohol wherein the fatty alcohol and oxoalcohol contain from 5 to 10 moles of ethylene oxide,

(b) from about 10 to about 90% by weight of at least one fatty acid ester selected from the group consisting of isopropyl myristate, isopropyl palmitate, isopropyl stearate, oleyl oleate, hexyl laurate, di-n-butyladipate, caprylic or capric acid ester of saturated C_{12}–C_{18} fatty alcohols, esters of branched-chain C_8–C_{12} fatty acids with C_{14}–C_{20} fatty alcohols, decyl oleate, isooctyl stearate, glycerol trioleate, and i-butyl oleate,

(c) from about 1 to about 50% by weight of a monohydric C_1–C_4 alcohol,

(d) from about 0.5 to about 50% by weight of water,

(e) an aliphatic straight-chain and/or branched-chain liquid C_{10}–C_{40} hydrocarbon or mixtures of such hydrocarbons, present in a amount of up to 90% by weight of component (b), and (f) from about 2 to about 10% of either

(i) at least one C_{10}–C_{20} fatty alcohol and/or oxoalcohol wherein the fatty alcohol and oxoalcohol contain from 1 to 4 moles of ethylene oxide,

(ii) at least one C_{10}–C_{20} fatty amine containing from 1 to 4 moles of ethylene oxide, or

(iii) a mixture of (i) and (ii).

4,877,557

LUBRICATING OIL COMPOSITION

Ryousuke Kaneshige, and Kinya Mizui, both of Ichihara, Japan, assignors to Mitsui Petrochemical Industries, Ltd., Tokyo, Japan

Filed Feb. 11, 1988, Ser. No. 155,076

Claims priority, application Japan, Feb. 12, 1987, 62-28067

Int. Cl.[4] C10M *161/00*

U.S. Cl. 252—56 S 20 Claims

1. A lubricating oil composition excellent in compatibility, which comprises, as indispensable components, (A) 100 parts by weight of a synthetic hydrocarbon lubricating oil, (B) 0.1 to 20 parts by weight of at least one member selected from the group consisting of oiliness agents and extreme pressure agents and (C) 0.8 to 200 parts by weight of a liquid modified ethylene/α-olefin random copolymer, which is formed by graft-bonding an unsaturated carboxylic acid or a derivative thereof to an ethylene/α-olefin random copolymer, in which (i) the ethylene content in the unmodified ethylene/α-olefin random copolymer is 30 to 75 mole %, (ii) the grafting ratio of the unsaturated carboxylic acid or the derivative thereof is 0.2 to 50 parts by weight per 100 parts by weight of the unmodified ethylene/α-olefin random copolymer and (iii) the intrinsic viscosity as measured in decalin at 135° C. is in the range of from 0.01 to 0.3 dl/g and the molecular weight distribution ($\overline{Mw}/\overline{Mn}$) determined by gel permeation chromatography is not larger than 4.

4,877,558

METHOD OF TREATING RADIOACTIVE ION-EXCHANGE RESINS BY OXIDATIVE DECOMPOSITION

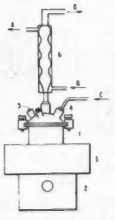
Takayuki Morioka; Nobuyuki Motoyama; Hiroshi Hoshikawa; Takeo Takahashi; Sizuo Suzuki; Tuyoshi Ishikawa; Takanori Toyoshi, and Toshio Uede, all of Kanagawa, Japan, assignors to Fuji Electric Co., Ltd., Kawasaki, Japan

Filed Apr. 29, 1987, Ser. No. 43,723

Claims priority, application Japan, Aug. 20, 1986, 61-194192

Int. Cl.[4] G21F *9/00*; C02F *1/72, 1/68*

U.S. Cl. 252—626 6 Claims



1. A method of oxidatively decomposing a radioactive ion-exchange resin containing an anion-exchange resin with hydrogen peroxide used as an oxidizing agent in the presence of iron and copper ions used as catalysts, wherein the weight ratio of hydrogen peroxide to the ion-exchange resin, that is, the ratio of the net weight of hydrogen peroxide of the dry weight of the ion-exchange resin containing an anion-exchange resin, is no higher than 17 and citric acid ions are preliminarily adsorbed on the radioactive ion-exchange resin before it is subjected to decomposition treatment or citric acid ions are copresent with the radioactive ion-exchange resin in the oxidatively decomposing system.

4,877,559

NEW PROCESS FOR THE PREPARATION OF ALPHA-6-DEOXY-5-HYDROXYTETRACYCLINE

Philip R. Page, Parede, and Ivan Villax, Lisboa, both of Portugal, assignors to Pluricheme Anstalt, Liechtenstein, Portugal

Division of Ser. No. 732,952, May 13, 1985, which is a continuation-in-part of Ser. No. 458,068, Jan. 14, 1983, Pat. No. 4,550,096. This application Oct. 27, 1986, Ser. No. 925,109

Claims priority, application Portugal, Jan. 19, 1982, 74.303; Dec. 30, 1982, 76.061; Dec. 28, 1984, 79.774

Int. Cl.[4] C07C *103/19*

U.S. Cl. 552—204 16 Claims

1. A new improved homogeneous hydrogenation process to prepare α-6-deoxy-5-hydroxytetracycline in high yield and purity from a 6-demethyl-6-deoxy-6-methylene-5-hydroxytetracycline acid addition salt in the presence or absence of a tertiary phosphine by stereospecific catalytic hydrogenation, characterised in that the catalyst is a new tertiary phosphinehydrazino-rhodium complex obtained by reacting a rhodium salt or a complex with a hydrazine or salt thereof, at a pressure of 1 to 10 kg/cm^2 and a temperature from 20° C. to 95° C. in the presence of a solvent inert in the reaction, and subsequently the pure α-6-deoxy-5-hydroxytetracycline formed is recovered directly from the reaction mixture as crystalline p-toluenesulphonate by addition of an excess of p-toluenesulphonic acid.

4,877,560

CARBURETOR AND VALVE MECHANISM

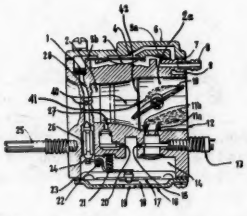
Brian P. Kenny, and Roger A. Bowles, both of Tralee, Ireland, assignors to Tillotson Ltd., Tralee, Ireland

Filed Apr. 14, 1988, Ser. No. 181,567

Claims priority, application Ireland, Apr. 14, 1987, 975/87; Apr. 14, 1987, 976/87

Int. Cl.[4] F02M *1/16*

U.S. Cl. 261—35 14 Claims



1. A carburetor comprising a main body portion defining a carburetor mixing passage comprising a venturi and a throttle bore and having an air intake side and an engine outlet side; a fuel pump; a fuel inlet supply channel for conveying fuel from the fuel pump to the carburetor mixing passage; a throttle shutter mounted within the carburetor mixing passage between the air intake side and the engine outlet side; a metering chamber for supplying fuel from the fuel pump into the carburetor mixing passage via a main discharge port and at least one idle discharge port, the main discharge port opening into the carburetor mixing passage on the air intake side of the throttle shutter; a starting fuel supply passage having an inlet port and an outlet port wherein said inlet port is in direct fluid communication with the supply channel and said outlet port is in direct fluid communication with the carburetor mixing passage and said inlet port is in direct fluid communication with said outlet port; manual valve means for selectively opening and closing the starting fuel supply passage such that when the throttle shutter is in a partially open position and the starting fuel supply passage is open, the fuel pump causes fuel to be injected through the starting fuel supply passage into the carburetor mixing passage, said manual valve means mounted directly in said carburetor main body wherein the means for selectively opening and closing the starting fuel supply passage comprises a movable member, means capable of biassing the member into a position to close the starting fuel supply passage, a two-position rotatable cam means acting between the carburetor and the movable member, said cam means comprises a first cam surface securable to the carburetor body and a second cam surface engaged with the movable member, such that a first position of the cam means defines a closed condition of the starting fuel supply passage and a second position of the cam means defines an open condition of the starting fuel supply passage.

4,877,561

METHOD OF PRODUCING LIPOSOME

Katsumi Iga, Suita; Naoru Hamaguchi, and Yasuaki Ogawa, both of Ibaraki, all of Japan, assignors to Takeda Chemical Industries, Ltd., Osaka, Japan

Filed Apr. 2, 1987, Ser. No. 33,498

Claims priority, application Japan, Apr. 2, 1986, 61-76102

Int. Cl.[4] A61K *9/66, 37/22, 45/05;* B01J *13/02*

U.S. Cl. 264—4.3 13 Claims

1. A method of producing liposomes with increased drug trap ratio, which comprises (1) providing a dispersion containing a drug and liposomes prepared from a phospholipid, (2) adding an organic solvent having a boiling point not higher than 100° C. to the dispersion to cause gel formation, and then (3) removing said organic solvent by evaporation to reconstitute liposomes.

4,877,562

MOLDING OF COMPOSITE PLASTICS PRODUCTS

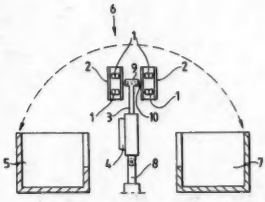
Keith Andrew Wilson, Wymington Nr. Rushden, and Ronald Ian Kliene, Pavenham, both of England, assignors to The Victaulic Company PLC, Hitchin and Tecron Industries Limited, Pavenham, both of, England

Filed May 8, 1987, Ser. No. 47,669

Claims priority, application United Kingdom, May 10, 1986, 8611470

Int. Cl.[4] B29C *41/04, 71/02, 71/04*

U.S. Cl. 264—22 3 Claims



1. A method of comprising a composite product having a welded thermoset portion, comprising:

rotomolding a mixture of crosslinkable polymer and a catalyst in a mold under conditions insufficient to cause significant crosslinking of the polymer, wherein the polymer remains thermoplastic in nature;

cooling the mold and subsequently withdrawing a molded thermoplastic article therefrom;

providing a second thermoplastic article;

welding the molded thermoplastic article to the second thermoplastic article; and

exposing the welded composite product to crosslinking conditions to convert a portion of the material from a thermoplastic material to a thermoset material.

4,877,563

PRODUCTION OF FOAMED POLYMER STRUCTURES

H. Eugene Broemmelsiek, Baton Rouge, La.; Raymond Lee, Elk Grove Village, Ill., and Carroll W. Lanier, Baker, La., assignors to Ethyl Corporation, Richmond, Va.

Continuation of Ser. No. 209,019, Jun. 20, 1988, abandoned.
This application Oct. 3, 1988, Ser. No. 251,797
Int. Cl.[4] B29C *35/00*
U.S. Cl. 264—26 51 Claims

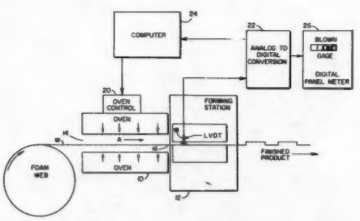
1. In a method of producing a foamed polymer structure in which a body of polyimide precursor is exposed to microwave radiation of intensity sufficient to cause the development of a foamed polymer structure through the generation and evolution of gaseous material within the body of the precursor, the improvement which comprises directing the microwave radiation upon the top, sides and ends of said body of polyimide precursor and of the foam structure as it is developing therefrom, but curtailing the extent to which radiation impringes upwardly into the bottom of said body and said foam structure by maintaining a microwave radiation curtailing shield in close proximity to the bottom of said body.

4,877,564

METHOD AND APPARATUS FOR MEASURING AND CONTROLLING BLOW-UP OF A FOAM SHEET IN A THERMOFORMER OVEN

Jonathan Gross, Canandaigua, N.Y., assignor to Mobil Oil Corporation, New York, N.Y.

Filed Jul. 25, 1988, Ser. No. 223,981
Int. Cl.[4] B29C *67/22, 51/08, 51/46*
U.S. Cl. 264—40.6 8 Claims



1. A method of measuring and controlling foam plastic sheet blow-up by regulating the operation of a thermoformer oven responsive to measuring of the thickness of a continuous sheet of a thermoformable foam plastic material which is conveyed through said thermoformer oven towards a thermoforming installation; comprising:

(a) sensing the sheet thickness of the thermoformable material at least at one location within a forming station of said thermoforming installation;

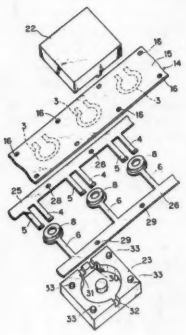
(b) and regulating the temperatures within said thermoformer oven in response to the blow-up in the sheet thickness sensed in said forming station by automatically varying the operation of the thermoformer oven for maintaining the temperatures ranges in said oven so as to thereby obtain a requisite blow-up of the material received in the forming station from said oven.

4,877,565

METHOD OF MANUFACTURING CIRCUIT COMPONENT SUCH AS STATOR FOR VARIABLE RESISTOR

Hiroji Tani; Tohru Kasanami, and Tsutomu Yokoi, all of Kyoto, Japan, assignors to Murata Manufacturing Co., Ltd., Japan

Filed Jun. 20, 1988, Ser. No. 209,290
Claims priority, application Japan, Jun. 19, 1987, 62-153637; Jun. 20, 1987, 62-154195
Int. Cl.[4] B29C *45/14*
U.S. Cl. 264—105 11 Claims



1. A method of manufacturing a circuit component comprising a substrate and a film electrical element provided on the surface of said substrate, said method comprising:

a step of preparing a first element for providing one of a substrate and a film electrical element in a solid state;

a step of treating the surface of said first element with a silane coupling agent;

a step of preparing a second element for providing the other one of said substrate and said film electrical element in a fluid state;

a step of applying said second element, being in a fluid state, on the surface of said first element being treated with said silane coupling agent; and

a step of hardening said second element in a state being in contact with the surface of said first element.

9. A method of manufacturing a stator, comprising a substrate of resin and a resistor film provided on the surface of said substrate, for a variable resistor, said method comprising:

a step of preparing a heat resistant film;

a step of providing a resistor film on said heat resistant film;

a step of obtaining a transfer sheet by treating said resistor film provided on said heat resistant film with a silane coupling agent;

a step of preparing a forming die having a cavity for forming a substrate;

a step of locating said transfer sheet in said forming die to expose at least a part of said resistor film in said cavity;

a step of introducing resin into said cavity to form a substrate joined with said at least a part of said resistor film; and

a step of separating said heat resistant film from said substrate to leave said resistor film.

4,877,566

NON-TOXIC RUBBER-BASED COMPOSITION AND METHOD FOR MAKING THE RUBBER BASED COMPOSITION

Tongil Cha, Seoul, Rep. of Korea, assignor to Pop-Limited, Georgetown, Caymen Islands

Filed Apr. 4, 1985, Ser. No. 719,701
Int. Cl.[4] B29C *59/00*
U.S. Cl. 264—118 1 Claim

1. A process for manufacturing a sticky, non-toxic rubber-based toy which comprises the steps of:

grinding styrene butadiene rubber into particles having a diameter of less than 0.5 millimeters,

adding an oil selected from the group consisting of paraffin and naphthene oils;

heating said oil and rubber to a temperature of 50° to 60° C.;

mixing said oil and rubber for from 13 to 15 minutes so that said oil becomes absorbed by said rubber;

adding ester gum, calcium carbonate and a coloring agent to said rubber and oil mixture, and

injection molding said rubber at a pressure of from about 100 to about 130 psi at from about 160° to about 180° C. to produce a sticky, rubber-based toy.

4,877,567

METHOD FOR MANUFACTURING AN ELECTRICALLY INSULATING FORMED CHANNEL MEMBER

Yasuji Yoshizumi, and Yoshiyuki Matsuoka, both of Ako, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Japan

Filed Feb. 26, 1988, Ser. No. 161,027
Claims priority, application Japan, Mar. 2, 1987, 62-47304
Int. Cl.[4] B29C *53/04*
U.S. Cl. 264—153 5 Claims

1. A method for manufacturing an electrically insulating formed channel member for use in electrically insulating an inner corner of a substantially rectangular pancake coil, said channel member comprising a channel portion including a web section, flange sections transversely extending from said web sections and projection portions extending outwardly from said flange sections, said channel member being bent to conform to the inner corner of the rectangular pancake coil with said web located at the inner side of the inner corner,

the method comprising:

preparing a unitary sheet of an electrically insulating press board capable of being press formed;

cutting and removing a portion of said press board to form projection portions along edges of the press board to relieve tensile stresses in said flange sections during press forming of the channel member; and

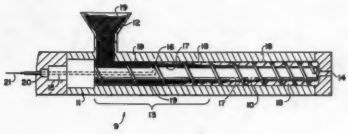
press forming said press board to form a formed channel member including said channel portion and said projection portion and bent to conform to the inner corner of the rectangular pancake coil with said web located at the inner side of the inner corner with the projection portions disposed transversely to said web.

4,877,568

PREPARATION OF PLASTIC EXTRUDATE CONTAINING AN ADDITIVE

Robert C. Austin, 1149 Romaine Clr. East, Jacksonville, Fla. 32225

Filed May 18, 1988, Ser. No. 195,255
Int. Cl.[4] B29C *47/10*
U.S. Cl. 264—211.21 25 Claims



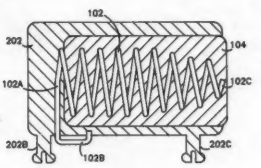
1. A process for incorporating an additive into a molten plastic mass which comprises introducing granular thermoplastic material into a screw extruder, introducing a liquid additive material into the unmelted granular material substantially at the root of the screw downstream of the location of introducing granular thermoplastic material into the screw extruder, and recovering a stream of molten thermoplastic with the additive material intimately dispersed therein.

4,877,569

METHOD OF MAKING A ONE-PIECE INJECTION MOLDED BATTERY CONTACT ASSEMBLY

Glenn F. Urbish, Coral Springs; William B. Mullen, III, Boca Raton, and Charles W. Mooney, Lake Worth, all of Fla., assignors to Motorola, Inc., Schaumburg, Ill.

Filed Jun. 6, 1988, Ser. No. 203,037
Int. Cl.[4] B29C *33/52, 39/10*
U.S. Cl. 264—221 2 Claims



1. A process for manufacturing a battery contact assembly, comprising the steps of:

providing a battery contact;

molding a plastic form around said battery contact, said plastic form being soluble in a solvent, a portion of said battery contact projecting from said plastic form;

molding a housing around said form, said housing being insoluble in said solvent, said portion of said battery contact being embedded into said housing; and

dissolving said form in said solvent.

4,877,570

METHOD FOR CONTINUOUSLY CRIMPING THERMOPLASTIC FILAMENTS

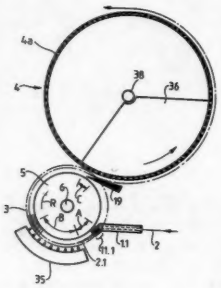
Werner Nabulon, Rüdlinger, Switzerland, assignor to Rieter Machine Works Ltd., Winterthur, Switzerland

Filed Oct. 3, 1988, Ser. No. 251,817
Claims priority, application Switzerland, Oct. 5, 1987, 03874/87
Int. Cl.[4] D02G *1/00*
U.S. Cl. 264—282 9 Claims

1. A method of continuously crimping thermoplastic filaments of a filament bundle, comprising the steps of:

applying a jet of a heated medium to a filament bundle;

introducing the filament bundle by means of the jet of the heated medium through a jet nozzle into a stuffing chamber of elongate curvature moving with a predetermined circumferential velocity, the filament bundle being introduced into the stuffing chamber substantially tangentially with respect to said elongate curvature of said stuffing



chamber and at a velocity which is greater than the predetermined circumferential velocity of the stuffing chamber; and

positively retaining the filament bundle in elevated position within the stuffing chamber such that the heated medium can escape from all sides of the filament bundle located in the stuffing chamber.

4,877,571

PROCESS FOR DEEP DRAWING COMPOSITE THERMOPLASTIC FOIL WITH A PVDC LAYER

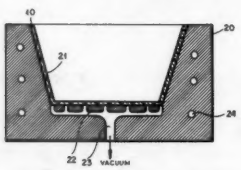
Hans Reifenhäuser, Troisdorf, Fed. Rep. of Germany, assignor to Reifenhauser GmbH & Co. Maschinenfabrik, Troisdorf, Fed. Rep. of Germany

Filed Nov. 4, 1987, Ser. No. 117,520

Claims priority, application Fed. Rep. of Germany, Nov. 5, 1986, 3637744

Int. Cl.[4] B29C *51/10, 51/14*

U.S. Cl. 264—512 **5 Claims**



1. A process for making a plastic container in which a deep drawable composite thermoplastic foil with a PVDC layer is subjected to a deep drawing process in a mold at a definite temperature and said plastic container is formed by said deep drawing process, said process comprising the steps of:

(a) heating said composite thermoplastic foil to a temperature above the crystallization temperature of said PVDC layer laminated thereto, said temperature of heating being over 130° C., and to disrupt the crystal structure of said PVDC layer and reduce the degree of crystallization thereof by at least 50%;

(b) immediately thereafter quenching said composite thermoplastic foil to a temperature below 50° C.; and

(c) thereafter deep drawing said foil upon the termination of the step (b), said quenching and deep drawing steps being effected in a time interval from 15 to 300 seconds.

4,877,572

PROCESS FOR THE PRODUCTION OF PBT CARPET YARN

Peter G. Clarke, Bad Homburg, Great Britain; Ulrich Mirwaldt, Offenbach/Main, and Dietmar Wandel, Hanau, both of Fed. Rep. of Germany, assignors to Davy McKee Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

Filed Nov. 14, 1988, Ser. No. 271,437

Int. Cl.[4] D01D *5/16;* D01F *6/62*

U.S. Cl. 264—555 **4 Claims**

1. A process for the production of polybutyleneterephthalate carpet yarn having a bulk level of at least 15% with thread development at 120° C., and a bulkiness defined as the difference of the degree of bulk with thread development at 120° C. to that at room temperature, of at least 9% absolute, by means of an integrated spinning-draw texturing process comprising:

(a) melt spinning polybutyleneterephthalate having an intrinsic viscosity of 0.9 to 1.2, and a water content of not more than 50 ppm by weight

said spinning being carried out at a temperature of 245° to 270° C., and a spinning draw down of 1:20 to 1:100;

(b) cooling the filaments in a quenching shaft by means of turbulence-free air flowing perpendicularly to the direction of the filaments at a speed of 0.4 to 0.8 m/sec.;

(c) coating the cooled filaments with an oil layer in the amount of at least 0.5% relative to the filament weight by means of an oil in water emulsion;

(d) drawing the filaments between two heated roller systems, the temperature of the first system lying in the range of 30° C. above or below the glass transition temperature, and that of the second system being at least 100° C. higher, the stretching ratio being high enough that the break elongation of the finished filaments is not in excess of 45%;

(e) feeding the drawn filaments from the second roller system at a speed of at least 1800 m/min. to a texturing unit, in which the filaments are blown and deformed in three dimensions with air having a temperature at least as high as that of said second roller system;

(f) discharging the filaments from the texturing unit to a cooling unit for a residence time sufficient to cool the filaments below the glass transition temperature;

(g) removing the filaments from said cooling unit by means of an unheated, third roller system, operating at a speed of at least 10% lower than that of said second roller system;

(h) controlling the process conditions of stage (a) to (g) in such a manner that the intrinsic viscosity in stage (j) is at maximum 5% lower than that in stage (a);

(i) intermingling the filaments by means of an air-blowing nozzle at an air pressure sufficient to attain an entangling node number of at least 12 per meter; and

(j) winding up the filaments.

4,877,573

SUBSTRATE HOLDER FOR WAFERS DURING MBE GROWTH

Boo Nilsson, Hoffman Estates, Ill., assignor to Litton Systems, Inc., Beverly Hills, Calif.

Continuation of Ser. No. 39,757, Apr. 16, 1987, abandoned, which is a continuation of Ser. No. 811,064, Dec. 19, 1985, abandoned. This application Nov. 7, 1988, Ser. No. 270,409

Int. Cl.[4] H01L *21/05, 21/84;* C30B *25/08, 23/06*

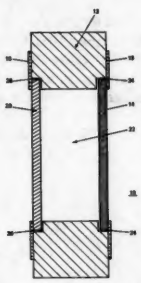
U.S. Cl. 156—610 **21 Claims**

1. Apparatus for holding a semi-conductor wafer during heating by radiation comprising:

(a) an apertured support means defining spaced-apart faces for receiving a generally-planar backplate and a wafer in spaced-apart substantially parallel relationship to define an enclosed volume through which radiation can pass;

(b) said backplate being fabricated of material selected from

the group consisting of gallium phosphide, pyrolytic boron nitride and sapphire; and



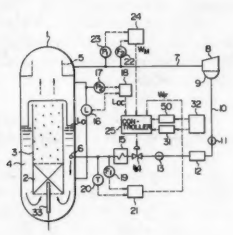
(c) means for retaining said backplate and said wafer in said support means.

4,877,574

METHOD OF AND APPARATUS FOR CONTROLLING POWER OF NATURAL CIRCULATION REACTOR

Hiroaki Suzuki, Hitachi; Yoshiyuki Kataoka, Ibaraki; Michio Murase, Mito; Kotaro Inoue; Isao Sumida, both of Ibaraki; Shozo Yamanari, Hitachi; Masaki Matsumoto, Katsuta; Satoshi Miura, and Koji Hashimoto, both of Hitachi, all of Japan, assignors to Hitachi, Ltd. and Hitachi Engineering Co., Ltd., both of Tokyo, Japan

Filed Mar. 2, 1988, Ser. No. 162,987
Claims priority, application Japan, Mar. 13, 1987, 62-56629
Int. Cl.[4] B21C *7/00*
U.S. Cl. 376—216 **10 Claims**



1. In a method of controlling the power of a natural circulation reactor having a reactor pressure vessel, a cylindrical shroud disposed within said reactor pressure vessel to surround a reactor core and to extend to a position above said reactor core, and a coolant descending passage defined between said reactor pressure vessel and said shroud for allowing coolant discharged from said reactor core to be returned to said reactor core, the improvement comprising the steps of:

adjusting the liquid level of said coolant in said coolant descending passage on the basis of a reactor power request signal at a position below the liquid level of coolant in said shroud, and

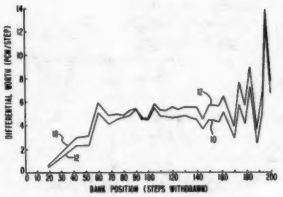
providing control over reactor power so that said reactor power may reach a predetermined reactor power by adjusting said liquid level of said coolant in said coolant descending passage.

4,877,575

CORE REACTIVITY VALIDATION COMPUTER AND METHOD

Albert J. Impink, Jr., Murrysville; Francis L. Langford, Jr., Forest Hills; Louis R. Grobmyer, North Huntingdon, and William K. Luinetti, Salem Township, Westmoreland County, all of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Jan. 19, 1988, Ser. No. 145,177
Int. Cl.[4] G21C *7/36*
U.S. Cl. 376—216 **8 Claims**



1. A method of core reactivity validation, comprising the steps of:

(a) determining at least two core reactivities using at least two neutron detectors; and

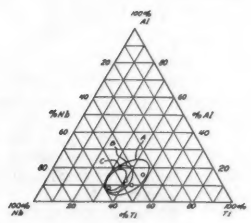
(b) comparing the core reactivities and indicating that the reactivities are valid when the reactivities are substantially coincident.

4,877,576

LOW DENSITY HIGH STRENGTH ALLOYS OF NB-TI-AL FOR USE AT HIGH TEMPERATURES

Melvin R. Jackson, 2208 Niskayuna Dr., Schenectady, N.Y. 12309

Filed Jun. 6, 1988, Ser. No. 202,357
Int. Cl.[4] C22C *29/00*
U.S. Cl. 420—426 **3 Claims**



1. As a composition of matter,

an alloy consisting essentially of niobium, titanium and aluminum in the approximate concentration in atom percent as follows: titanium 31 to 48, aluminum 8 to 21, the balance being essentially niobium.

4,877,577

COPPER ALLOY LEAD FRAME MATERIAL FOR SEMICONDUCTOR DEVICES

Rensei Futatsuka; Syuu-ichi Chiba, and Tadao Sakakibara, all of Japan, assignors to Mitsubishi Shindoh Co., Ltd., Tokyo, Japan

Filed Oct. 12, 1988, Ser. No. 256,747
Claims priority, application Japan, Apr. 25, 1988, 63-101748
Int. Cl.[4] C22C 9/02
U.S. Cl. 420—473 3 Claims

1. A copper alloy material for lead frames for semiconductor devices, which consists essentially of:
Ni: 0.5 –2 percent by weight;
Sn: 1.2 –2.5 percent by weight;
Si: 0.05 –0.5 percent by weight;
Zn: 0.1 –1 percent by weight;
Ca: 0.001 –0.01 percent by weight;
Mg: 0.001 –0.05 percent by weight;
Pb: 0.001 –0.01 percent by weight; and
Cu and inevitable impurities: the balance.

4,877,578

CORROSION INHIBITORS

Michael J. Zetlmeisl, and William F. Fahey, both of St. Louis, Mo., assignors to Petrolite Corporation, St. Louis, Mo.

Filed Mar. 29, 1985, Ser. No. 717,916
Int. Cl.[4] C23F 11/12, 11/14
U.S. Cl. 422—14 19 Claims

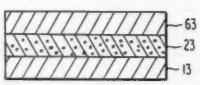
1. Process of minimizing hydrocarbon carryunder while inhibiting corrosion in a chemical industry process water system comprising adding thereto an effective corrosion inhibiting amount of the reaction product of an alkylenepolyamine and formaldehyde, wherein said water system is in an oil refinery.

4,877,579

MULTILAYER DEVICE FOR DETECTING BILURUBIN

Kenichiro Yazawa; Osamu Seshimoto; Masao Kitajima, and Asaji Kondo, all of Saitama, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Continuation of Ser. No. 842,748, Mar. 19, 1986, abandoned, which is a continuation of Ser. No. 542,569, Oct. 19, 1983, Pat. No. 4,612,290, which is a continuation of Ser. No. 294,278, Aug. 19, 1981, abandoned. This application May 23, 1988, Ser. No. 198,590
Claims priority, application Japan, Aug. 19, 1980, 55-112998
The portion of the term of this patent subsequent to Sep. 16, 2003, has been disclaimed.
Int. Cl.[4] G01N 33/72
U.S. Cl. 422—56 20 Claims



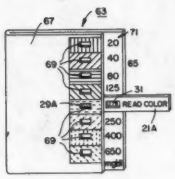
13. A device for quantitatively determining the amount of bilirubin in an aqueous liquid sample comprising:
an indicator layer which includes a hydrophobic bilirubin extracting composition, wherein the bilirubin extracting composition comprises a hydrophobic oil-soluble primary, secondary or tertiary amine capable of extracting bilirubin and an extraction aid, said bilirubin extracting composition being hydrophobic to such an extent that it forms at least an emulsion when it is dispsered in neutral water and wherein said device has a single layer containing said bilirubin extracting composition, there being present a dissociating agent for bilirubin in a layer above the indicator layer in an amount sufficient to completely dissociate all bilirubin in a sample and wherein the device includes a light-transmitting, water-impermeable support with the indicator layer overlaying the support and being in direct contact therewith.

4,877,580

ASSAY KIT INCLUDING AN ANALYTE TEST STRIP AND A COLOR COMPARATOR

Jack L. Aronowitz, Delray Beach, and Louis Terminiello, Sunrise, both of Fla., assignors to Technimed Corporation, Fort Lauderdale, Fla.

Filed Feb. 9, 1988, Ser. No. 153,967
Int. Cl.[4] G01N 1/48
U.S. Cl. 422—58 15 Claims



15. A test means comprising:
(a) a test strip which includes an inert support and a sample receptive medium comprising a dry chemistry reagent system specific for an analyte of interest which upon interaction with said analyte produces a characteristic color indicative of an assay value of said analyte of interest, said receptive medium being positioned on said test strip so as to be bordered on one or more sides by said inert support;
(b) a container and a label wrapped around and adhered to the outside surface of said container, said label having a distal panel on one side thereof overlapping a proximal panel on the other side thereof, and an adhesive-free space therebetween,
(c) a color comparator, comprising said overlapping distal panel and said overlapped proximal panel, said overlapping distal panel including a plurality of different color fields representing a range of assay values physically arranged in a predetermined ordered succession for comparison with the color of the sample receptive medium of the test strip, each successive field connoting a different numerical assay value, each of said color fields having an aperture which permits viewing therethrough of at least a portion of a reaction zone of the sample receptive medium after said analyte has reacted to produce a color therein; and
(d) means for positioning said test strip between said distal panel and said proximal panel and relative to the aperture of each of said color fields so as to mask from view the inert support which borders the reaction zone of the sample receptive medium.

4,877,581

CATALYST FOR DEWAXING HYDROCARBON FEEDSTOCK

Nai Y. Chen, Titusville, N.J., and Dennis E. Walsh, Richboro, Pa., assignors to Mobil Oil Corporation, New York, N.Y.

Filed Sep. 1, 1988, Ser. No. 239,257
Int. Cl.[4] C07C 5/13
U.S. Cl. 585—751 15 Claims

1. A paraffin conversion process for hydroisomerizing a nitrogen and wax-containing hydrocarbon feedstock comprising:
contacting said hydrocarbon feedstock with a catalyst including a ZSM-11 zeolite which has been steamed to achieve an alpha from about 10 to about 50, in combination with a Group VIII metal hydrogenation-dehy-

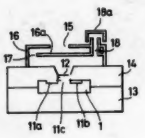
drogenation component selected from the group consisting of platinum and palladium at a temperature of about 400° F. to about 850° F. and at a pressure of from about 200 to about 2000 psig.

4,877,582

CHEMICAL SENSOR DEVICE WITH FIELD EFFECT TRANSISTOR

Shohei Oda; Osamu Seshimoto; Tohru Sueyoshi, and Hiroyuki Amano, all of Saitama, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Aug. 20, 1987, Ser. No. 87,508
Claims priority, application Japan, Aug. 20, 1986, 61-194973
Int. Cl.[4] G01N *27/00*
U.S. Cl. 422—68 **14 Claims**



1. In a chemical sensor device for analyzing a specific substance in a liquid, comprising a chemical receptor for chemically reacting said specific substance in a sample liquid and a field effect transistor connected to said chemical receptor for converting the chemical reaction into a measurable electrical signal, the improvement which comprises;

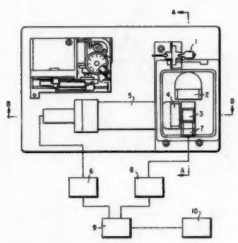
said field effect transistor connected to said chemical receptor being installed in a housing having light-shielding properties, said housing having an opening portion which receives and introduces to said chemical receptor the sample liquid and a light-shielding means which substantially prevents external light from reaching said field effect transistor but permits the sample liquid to reach said chemical receptor; said light-shielding means comprising a liquid-permeable and light-absorptive porous member for covering said opening portion; and, channel means for conveying the sample to said chemical receptor.

4,877,583

FLUORESCENT ANALYZER

Harufumi Miwa, Tokyo; Minoru Kashiwada, and Ikuo Goto, both of Kawaguchi, all of Japan, assignors to Ajinomoto Company, Inc., Tokyo, Japan

Filed Mar. 29, 1988, Ser. No. 174,818
Claims priority, application Japan, Apr. 1, 1987, 62-77486
Int. Cl.[4] G01N *33/16, 21/00*
U.S. Cl. 422—73 **1 Claim**



1. A fluorescent anlyzer comprising:

a light source for irradiating a sample with light;

a first wave selector for passing a first predetermined wavelength of light emitted from the light source in a path to said sample in a first direction;

a sample cell for holding said sample in said light path;

a second wave selector arranged in a second direction perpendicular to said first direction passing light of a second predetermined wavelength emitted in said second direction from the sample upon irradiation by light passed by said first wave selector;

a first light detector for producing a first output signal indicative of the amount of light of said second predetermined wavelength passed by said second wave selector;

a second light detector for producing a second output signal indicative of the amount of light of said first predetermined wavelength passing through the sample in said first direction;

a correction circuit for performing a predetermined correction of an amplitude of the first output signal based on an amplitude of the second output signal to produce a correction measurement signal, said correction circuit performing said correction based on the following relationship:

$$Xs' = Xs - [k\ (Ys - Y_1)],$$

where

Xs'=the corrected measurement signal,

Xs=the first output signal obtained from the sample,

Ys=the second output signal obtained from the sample,

Y_1=a predetermined constant, and

k=a predetermined constant; and

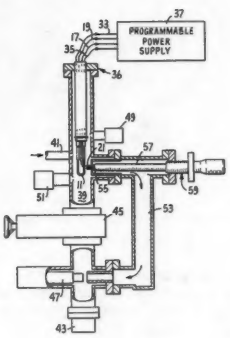
an indication means for indicating the corrected measurement signal.

4,877,584

TEMPERATURE PROGRAMMED SPECTROSCOPY TECHNIQUES

John T. Yates, Jr., 8602 Irvington Ave., Bethesda, Md. 20817; Gregory L. Griffin, Dept. of Chemical Engr. & Materials Science, University of Minnesota, Minneapolis, Minn. 55455, and Maya Kiskinova, Institut fur Grenzflachenforschung und vakuum phusik, KFA.IGV, Postfach 1913, D-5170, Julich 1, Fed. Rep. of Germany

Division of Ser. No. 416,666, Sep. 10, 1982, Pat. No. 4,663,297.
This application Apr. 22, 1987, Ser. No. 41,594
Int. Cl.[4] G01N *25/00, 30/00*
U.S. Cl. 422—88 **3 Claims**



1. Apparatus for analyzing gaseous reactions on a surface of a quantity of material, comprising:

an enclosed reaction chamber,

means connectable to said chamber for introducing gas thereinto,

means connectable to said chamber for controlling pressure of the gas therein,

an electrically resistive filament held within said chamber and adapted to carry a quantity of material thereon,

means connecting an electrical potential across said filament for controlling the level of electrical current therethrough, whereby heating of said filament and any material carried thereon may be controlled,

means including a tube extending from outside said chamber and terminating within said chamber at one end in an orifice positioned adjacent to but spaced apart from said filament for extracting gas from a region of said chamber adjacent said filament,

means attached to an area of said filament surface in the vicinity of said tube end orifice for providing an electrical signal that is proportional to temperature of said surface area, whereby the temperature of the surface of a quantity of material carried by said filament adjacent said area may be monitored, and

means continuously receiving gas from said gas extracting means at another end of said tube outside of said chamber for analyzing the gas removed from the region adjacent said filament, whereby the product of any gaseous reactions on the surface of the quantity of material carried by said filament in said region may be analyzed.

4,877,585
DILUTION PIPETTE DEVICE

Daniel Perlman, Arlington, Mass., assignor to Brandeis University, Waltham, Mass.

Filed Dec. 9, 1987, Ser. No. 130,406
Int. Cl.[4] B01L *3/02*
U.S. Cl. 422—100 **12 Claims**

2. A graduated pipette having a known delivery volume, suitable for accurately dispensing both known large and known small volumes of a fluid, wherein said small volume is less than one fourth of the delivery volume of said pipette, said pipette consisting of:

an unobstructed upper and a lower elongated tube joined together to form a single continuous unit open at both ends, said upper tube having a different internal diameter from said lower tube,

said upper tube having coarse indicia suitable for accurately dispensing said large volume,

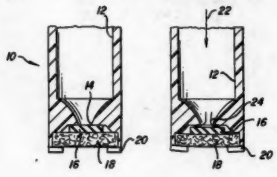
said lower tube having fine indicia suitable for accurately dispensing said small volume,

wherein said upper tube comprises a mouthpiece suitable for allowing fluid to be sucked up into said unit, and said lower tube comprises a constricted suitable to allow accurate control of fluid flow said unit, wherein said fluid is accurately from said unit only through said constricted wherein said upper and lower tubes are detachably secured together by a connector.

4,877,586
SLIDING TEST DEVICE FOR ASSAYS

Mark J. Devaney, Jr., and Edward H. Wanneawetsch, both of Rochester, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Jul. 27, 1988, Ser. No. 224,831
Int. Cl.[4] B01L *11/00*; G01N *31/22*
U.S. Cl. 422—101 **13 Claims**



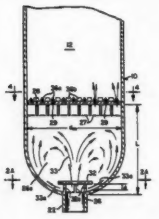
1. In a test device useful for conducting a reaction, said device comprising (a) a well configured to confine temporarily a liquid sample from a patient admixed with at least one reagent, to provide said reaction, (b) a filter at the bottom of said well with pores effective to pass free, unreacted reagent but not complexed or reacted reagent, and (c) an absorbent material underneath said filter effective to draw off liquid in said well after said reaction,

the improvement wherein said device further includes (d) a non-absorbent pad underneath said filter, adjacent to said absorbent material, and (e) means for moving both (i) said filter and said absorbent material relative to each other and (ii) said filter and said pad relative to each other, between two positions, one in which said filter contacts said non-absorbent pad and the other in which filter contacts said absorbent material.

4,877,587
FLUIDIZED BED POLYMERIZATION REACTORS

Seung J. Rhee, South Somerville, N.J., and Larry L. Simpson, South Charleston, W. Va., assignors to Union Carbide Chemicals and Plastics Company Inc., Danbury, Conn.

Division of Ser. No. 780,273, Sep. 26, 1985, which is a continuation-in-part of Ser. No. 643,882, Aug. 24, 1984, abandoned. This application Dec. 17, 1987, Ser. No. 134,512
Int. Cl.[4] B01J *8/20*; C08F *2/34*
U.S. Cl. 422—135 **5 Claims**



1. In the operation of a fluidized bed polymerization reactor having distributor plate means positioned below said bed to provide both distribution of fluid and physical support for said bed; entry means at or near the base of said reactor for passage of fluid into said reactor; generally annular fluid flow deflector means including aperture means associated with said entry means and a mixing chamber positioned between said distribu-

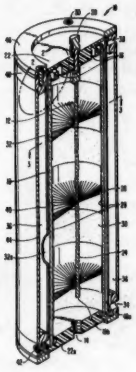
tor plate means and said entry means and wherein a fluid stream comprising a gas is continuously introduced into said reactor through said entry means, passed upward through said mixing chamber, through said distributor plate means and through said fluidized bed, the improvement which comprises providing said aperture means with sufficient size to allow passage of the fluidizing medium upwardly therethrough and dividing the entering fluid stream into at least two streams, a first stream flowing upward and outward in a fluid flow path peripherally between said aperture means and the wall of said mixing chamber and a second stream flowing in a central upward fluid flow path through said annular flow deflector means, the combined velocity and orientation of all fluid flow paths being capable of entraining and passing solid particles and liquid out of said mixing chamber through said distributor plate means and into said fluidized bed.

4,877,588

METHOD AND APPARATUS FOR GENERATING OZONE BY CORONA DISCHARGE

Lee C. Ditzler, Diablo; Ronald F. Lemberger, Danville, and Cynthia L. Slezak, Pleasanton, all of Calif., assignors to Trineos, Pleasanton, Calif.

Filed Jun. 17, 1988, Ser. No. 210,469
Int. Cl.[4] C01B *13/11*
U.S. Cl. 422—186.19 **7 Claims**



1. Apparatus for generating ozone from an oxygen-containing gas:

an inner cylinder of thermally conductive dielectric material surrounded by an intermediate cylinder of thermally and electrically conductive material to define a first annular space, said intermediate cylinder surrounded by an external cylinder to define a second annular space;

a passage at one end of said inner cylinder communicating the interior thereof with said first annular space, whereby gas emerging from said inner cylinder is directed into said first annular space to flow therethrough countercurrent to said gas in said inner cylinder;

a plurality of conductive bands along the interior surface of said dielectric cylinder to define corona discharge regions in said first annular space, said conductive bands spaced apart axially to define corona-free regions therebetween of sufficient axial dimension to permit removal of heat generated in said corona discharge regions by heat exchange through said inner cylinder and said through said intermediate cylinder; and

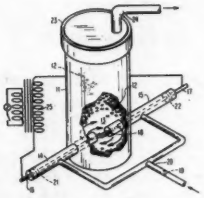
means for supplying current to said conductive bands.

4,877,589

NITROGEN FIXATION BY ELECTRIC ARC AND CATALYST

Louis R. O'Hare, 6101 Sequoia Rd., NW., Apt. A-20, Albuquerque, N. Mex. 87120

Filed Sep. 19, 1988, Ser. No. 246,212
Int. Cl.[4] C01B *21/20*
U.S. Cl. 422—186.24 **14 Claims**



1. A nitrogen fixation system comprising:

(1) a low frequency, high voltage electric arc production means in the form of two electrodes with electrically insulating, coaxial sleeves, said electrodes being electrically connected to a low frequency, high voltage alternating current transformer, and said electric arc are being capable of raising nitrogen and oxygen to plasma state temperatures and of placing the gases into chemically excited states, and

(2) an electric arc chamber for contacting a catalyst with arc plasma gases, said chamber being in the form of a cavity which is produced by pressurized streams of reactant gases heated to the plasma state and expanding from within a catalyst bed in a chamber, the inner surface of said cavity being composed of catalyst particles being contacted and impacted by said outward moving plasma state reactant gases, and

(3) a product gas shielding means for shielding the gas product such as nitric oxide from the destructive effects of ultraviolet light emitted by the arc, said effects being capable of disassociating nitric oxide into nitrogen and oxygen, said shielding means being in the form of catalyst particles compacted by the weight of a vertical column of the catalyst bed above the arc cavity in the catalyst chamber and pressing downward about the cavity to provide a cavity wall of compacted catalyst particles opaque to light but permeable to the flow of gas species, and

(4) reactant gas transport means in the form of said electrode sleeves, said sleeves being capable of conducting nitrogen and oxygen from inlet ducts to the arc zone through cylindrical channels within said sleeves between the electrode and the inner wall of each sleeve, and

(5) heat transfer means in the form of gas driven particle turbulence whereby catalyst particles are moved by the reactant gas stream and plasma heat to and from the arc and the chamber walls, and

(6) reactant gas circulation means capable of producing gas pressure for impelling reactant and product gases through said arc zone and catalyst chamber and of producing such particle displacement as to form said arc cavity and sufficient particle agitation for rapid heat transfer.

4,877,590

PROCESS FOR NITROGEN OXIDES REDUCTION WITH MINIMIZATION OF THE PRODUCTION OF OTHER POLLUTANTS

William R. Epperly, New Canaan; John H. O'Leary, Danbury; James C. Sullivan, Westport, and Barry N. Sprague, West Haven, all of Conn., assignors to Fuel Tech, Inc., Stamford, Conn.

Continuation-in-part of Ser. No. 22,799, Mar. 6, 1987, abandoned, and a continuation-in-part of Ser. No. 50,198, May 14, 1987, Pat. No. 4,780,289, and a continuation-in-part of Ser. No. 108,779, Oct. 14, 1987, abandoned, and a continuation-in-part of Ser. No. 90,962, Aug. 28, 1987, Pat. No. 4,777,024. This application Feb. 29, 1988, Ser. No. 155,864
The portion of the term of this patent subsequent to Oct. 25, 2005, has been disclaimed.
Int. Cl.[4] C01B *21/00*
U.S. Cl. 423—235 41 Claims

1. A process for reducing the concentration of nitrogen oxides in an effluent which is at a temperature below about 1450° F. while minimizing the production of other pollutants, the process comprising:

a. determining the condition of the effluent which exists at a location for introduction of a treatment agent;

b. effecting a treatment regimen which comprises introducing a treatment agent comprising a hydrocarbon into the effluent to reduce the nitrogen oxides concentration in the effluent under said determined effluent conditions while minimizing the production of other pollutants;

c. monitoring the condition of the effluent until a significant alteration in the condition of the effluent is observed;

d. adjusting said treatment regimen by varying at least one of the following parameters

(i) dilution and introduction rate of said hydrocarbon treatment agent;

(ii) composition of said hydrocarbon treatment agent; and

(iii) relative presence of the components of said hydrocarbon treatment agent,

to effect an adjusted treatment regimen, wherein said adjusted treatment regimen operates under conditions effective to reduce the nitrogen oxides concentration in the effluent under said altered effluent conditions while minimizing the production of other pollutants.

4,877,591

PROCESS FOR THE REDUCTION OF NITROGEN OXIDES IN AN EFFLUENT USING SUGAR

William R. Epperly, New Canaan, and James C. Sullivan, Southport, both of Conn., assignors to Fuel Tech, Inc., Stamford, Conn.

Filed Mar. 13, 1987, Ser. No. 25,350
Int. Cl.[4] C01B *21/00*
U.S. Cl. 423—235 12 Claims

1. A process for the reduction of the concentration of nitrogen oxides in the oxygen-rich effluent from the combustion of a carbonaceous fuel, the process comprising injecting a treatment agent which comprises urea and sugar into an effluent having a temperature of greater than about 1300° F. under conditions effective to reduce the concentration of nitrogen oxides in the effluent.

4,877,592

METHOD OF CATALYTIC CLEANING OF EXHAUST GASES

Jury S. Matros; Viktor A. Chumachenko; Ljudmila J. Zudilina; Alexandr S. Noskov, all of Novosibirsk, and Evgeny S. Bugdan, Novosibirskaya, all of U.S.S.R., assignors to Institut Kataliza Sibirskogo Otdelenia Akademii Nauk SSSR and Spetsialnoe Konstruktorsko-Technologicheskoe Bjuro Katalizatorov S Optnym Zavodom (Skib Katalizatorov), both of Novosibirsk, U.S.S.R.

PCT No. PCT/SU87/00066, § 371 Date Jun. 2, 1988, § 102(e) Date Jun. 2, 1988, PCT Pub. No. WO88/02660, PCT Pub. Date Apr. 21, 1988
PCT Filed Jun. 2, 1987, Ser. No. 239,956
Claims priority, application U.S.S.R., Oct. 17, 1986, 4131464; Oct. 17, 1986, 4131459
Int. Cl.[4] B01J *8/00;* C10H *23/00;* C01B *31/18*
U.S. Cl. 423—245.1 2 Claims

1. A method for the reversible flow catalytic oxidation of a gas stream containing organic compositions and/or carbon monoxide which comprises:

(1) passing the gas stream through a first bed of oxidation catalyst to oxidize at least a portion of the organic composition and/or carbon monoxide;

(2) mixing the gas stream passing from the first bed of oxidation catalyst so that the difference in temperature between the coldest portion of the gas stream and the hottest portion of the gas stream is not more than 50° C.;

(3) passing the mixed gas stream through a second bed of oxidation catalyst to further oxidize the oxidizable materials in the gas stream; and

(4) reversing the direction of flow of the gas stream wherein the second bed of oxidation catalyst becomes the first bed of oxidation catalyst and wherein the temperature of the catalyst beds is maintained in the range of 350° C. to 750° C.

4,877,593

SYNTHESIS OF CRYSTALLINE ALUMINOPHOSPHATE COMPOSITION

Ernest W. Valyocsik, Yardley, Pa., assignor to Mobil Oil Company, New York, N.Y.

Filed Mar. 10, 1988, Ser. No. 166,586
Int. Cl.[4] C01B *25/36;* B01J *27/18;* C10G *0/0*
U.S. Cl. 423—306 18 Claims

1. A method for syntehsizing a crystalline aluminophosphate composition having crystals exhibiting a characteristic X-ray diffraction pattern as shown in Table 1 of the specification, which comprises (i) preparing a mixture capable of forming said aluminophosphate, said mixture comprising sources of an oxide of aluminum, an oxide of phosphorus, water and a directing agent (R), and having a composition, in terms of mole ratios, within the following ranges:

P_2O_5/Al_2O_3	0.01 to 20
H_2O/Al_2O_3	2 to 400
H^+/Al_2O_3	0.01 to 30
R/Al_2O_3	0.02 to 20

wherein R is a C_5–C_7 alkyldiamine, (ii) maintaining said mixture under sufficient conditions until crystals of said aluminophosphate are formed and (iii) recovering said crystalline aluminophosphate from step (ii).

4,877,594

PURIFICATION OF PHOSPHORIC ACID

Laurence W. Bierman; Michael L. Lopez, and James E. Perkins, III, all of Pocatello, Id., assignors to J. R. Simplot Co., Pocatello, Id.

Filed Dec. 13, 1988, Ser. No. 283,560
Int. Cl.[4] C01B 25/16
U.S. Cl. 423—321 S 19 Claims

1. A process for purifying impure phosphoric acid, comprising the steps of:

furnishing impure phosphoric acid;

adding to the impure phosphoric acid, to form a modified acid, a modifier selected from the group consisting of

a polyphosphate, and

a cation selected from the group consisting of ammonium ion and an alkali metal ion;

mixing the modified acid with a mixture of alcohols, the mixture of alcohols including both

a low molecular weight alcohol selected from the group of alcohols having from 1 to 3 carbon atoms, and mixtures thereof, and

a high molecular weight alcohol selected from the group of alcohols having from 4 to 12 carbon atoms, and mixtures thereof; and

separating the mixture of alcohols and prepared acid into two fractions, a first fraction including the high molecular weight alcohol and the phosphate values dissolved therein, and a second fraction including the low molecular weight alcohol and the impurities originally present in the impure phosphoric acid.

4,877,595

METHOD OF COMPRESSING PYROGENICALLY PREPARED SILICIC ACID

Reinhard Klingle, Wasserlos, and Reinhard Manner, Dörnigheim, both of Fed. Rep. of Germany, assignors to Degussa Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

Filed Feb. 16, 1988, Ser. No. 155,709
Claims priority, application Fed. Rep. of Germany, Feb. 26, 1987, 3706137; Dec. 10, 1987, 3741846
Int. Cl.[4] C01B 33/12; C05B 19/00; A01J 21/00; B65B 1/20
U.S. Cl. 423—335 2 Claims

1. A method of compressing pyrogenically prepared silicic acid which comprises rotating a drum having a filter covering on its peripheral surface while the lower surface of the drum is in contact with a body of pyrogenically prepared silica, applying vacuum to the interior of the drum to draw a layer of pyrogenically prepared silica into contact with the peripheral surface of the drum, the layer of pyrogenically prepared silica being lifted from said body as the drum rotates, moving a flexible belt in an orbital path parallel with a substantial portion of the upper portion of the peripheral surface of said drum, compressing said pyrogenically prepared silica between said belt and said drum, and releasing the vacuum to separate the compressed pyrogenically prepared silicic acid from the drum.

4,877,596

PROCESS FOR THE PRODUCTION OF LOW CARBON SILICON

Ingo Schwirtlich; Peter Woditsch, and Wolfgang Koch, all of Krefeld, Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Filed Aug. 3, 1987, Ser. No. 80,879
Claims priority, application Fed. Rep. of Germany, Aug. 14, 1986, 3627624
Int. Cl.[4] C01B 33/02
U.S. Cl. 423—348 7 Claims

1. Process for the removal of carbon from molten silicon which comprises first heating the molten silicon in a vessel to temperatures of 1420° to 1900° C. and establishing a temperature gradient of 30 to 400° K in the melt, wherein the temperature gradient is established by cooling the bottom of the vessel containing the molten silicon to a temperature in the range of 1420° to 1500° C., then removing the melt from the vessel to produce silicon having a carbon content of from 60 to 95 atoms per million silicon atoms.

4,877,597

METHOD FOR PRODUCING AQUEOUS SOLUTIONS OF BASIC POLY ALUMINUM SULPHATE

Dieter Haase, Ste-Catherine, and Nelu Spiratos, LaPrairie, both of Canada, assignors to Handy Chemicals Ltd., LaPrairie, Canada

Filed Oct. 25, 1988, Ser. No. 262,320
Int. Cl.[4] C01F 7/74
U.S. Cl. 423—556 17 Claims

1. A process for the preparation of a basic poly aluminum sulphate solution having the following formula:

$$[Al_A(OH)_B(SO_4)_C(H_2O)_E]_n$$

in which

n is a positive integer;

A is 1.0;

B ranges from 0.75–2.0;

C ranges from 0.5–1.12; and

E is larger than 4 when the product is in aqueous form, wherein the basicity of said basic poly aluminum sulfate solution is defined as B/3A $\times 100$ and said basicity is 25–66% and wherein

$B+2C=3$

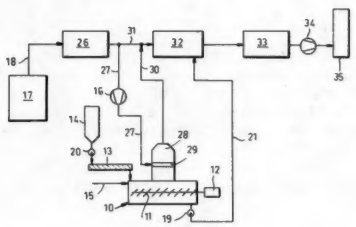
said process comprising the step of reacting in a one step process an aluminum sulphate solution with an alkali metal aluminate solution under high shear mixing conditions sufficient to produce a reactive $Al(OH)_3$ gel and to produce a transparent basic poly aluminum sulfate solution and recovering the desired product.

4,877,598

CONTINUOUS PROCESS FOR THE DRY SLAKING OF LIME

Wenzel Von Jordan, Darmstadt; Rolf Draf, Friedrichsdorf; Dieter Gröne, Worms, and Harald Sauer, Frankfurt, all of Fed. Rep. of Germany, assignors to Metallgesellschaft Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

Filed Mar. 3, 1989, Ser. No. 319,435
Claims priority, application Fed. Rep. of Germany, Mar. 3, 1988, 3806798
Int. Cl.[4] C04B 2/04
U.S. Cl. 423—640 6 Claims



1. A process for the dry slaking of lime, comprising the steps of:

(a) continuously feeding finely ground lime and only sufficient water to dry slake the continuously fed lime to a slaking vessel and slaking the lime with the water in said vessel to produce a slaked hydrated lime;

(b) continuously withdrawing said slaked hydrated lime from said vessel;

(c) evacuating an exhaust gas containing lime dust and water vapor from said vessel; and

(d) adding to said exhaust gas a hot gas in a direction which is tangential and at a right angle to said exhaust gas, said hot gas being at a temperature and in an amount sufficient to prevent the exhaust gas from contacting the inner surface of the exhaust gas duct and to prevent deposits of calcium hydroxide from said exhaust gas.

4,877,599

DETECTION OF VASCULAR DISEASE WITH LABELLED ANTIBODIES

Robert S. Lees, Brookline, Mass., assignor to New England Deaconess Hospital Corporation, Boston, Mass.

Continuation of Ser. No. 929,012, Nov. 10, 1986, abandoned. This application Jul. 11, 1988, Ser. No. 220,376

Int. Cl.[4] A61K *49/02, 49/00;* **C07K** *17/00*

U.S. Cl. 424—1.1 **17 Claims**

1. A conjugated diagnostic reagent having an antibody or fragment thereof with specific affinity for at least one arterial wall component associated with an abnormality of the vascular system, said arterial component being selected from the group consisting of insoluble, cross-linked elastin and insoluble, cross-linked fragments thereof and chondroitin sulfate proteoglycan compounds, a labeling means for labeling said antibody or fragment thereof, and not including porphyrin or derivatives thereof.

4,877,600

LYSINE SALT OF THE GADOLINIUM-DOTA COMPLEX AND ITS DIAGNOSTIC APPLICATIONS

Bruno Bonnemain, Mitry Mory; Jean Lautrou, Saint Mande, and Dominique Meyer, Paris, all of France, assignors to Guerbet S.A., Villepinte, France

PCT No. PCT/FR87/00114, § 371 Date Dec. 7, 1987, § 102(e) Date Dec. 7, 1987, PCT Pub. No. WO87/06229, PCT Pub. Date Oct. 22, 1987

PCT Filed Apr. 7, 1987, Ser. No. 141,360

Claims priority, application France, Apr. 11, 1986, 86 05235

Int. Cl.[4] C07D *257/02;* **A61K** *49/04, 40/00*

U.S. Cl. 424—4 **5 Claims**

1. The lysine salt of the gadolinium(III) complex of 1,4,7,10-tetra-azacyclododecane-N,N′,N″,N‴-tetra-acetic acid.

2. An administratable composition suitable for administration to humans as a contrast agent in magnetic resonance imaging and in radiologic X-ray imaging, said composition comprising an effective amount of the lysine salt of the gadolinium (III) complex of 1,4,7,10-tetra-azacyclododecane-N,N′,N″,N‴-tetra-acetic acid.

4,877,601

ADSORBENT COMPOSITION

John J. Wren, London, England, assignor to Watney Combe Reid & Truman Limited, London, England

PCT No. PCT/GB86/00386, § 371 Date Feb. 18, 1987, § 102(e) Date Feb. 18, 1987, PCT Pub. No. WO87/00049, PCT Pub. Date Jan. 15, 1987

PCT Filed Jul. 1, 1986, Ser. No. 27,028

Claims priority, application United Kingdom, Jul. 2, 1985, 8516670

Int. Cl.[4] A61K *33/06*

U.S. Cl. 424—10 **6 Claims**

1. A method for reducing the alcohol content of the blood of human beings in need thereof comprising the oral administration of an edible composition comprising a dispersion in an edible or physiologically compatible base of an effective alcohol content-reducing amount of a physiologically inert hydrophobic crystalline essentially silicon and oxygen zeolite of pore size permitting the absorption of ethanol but preventing the absorption of larger molecules with lipophilic character that occur in significant concentration in the digestive system.

4,877,602

TRANSPARENT DENTIFRICES

Michio Uematsu, Isehara, and Nobuo Suganuma, Narashino, both of Japan, assignors to Lion Corporation, Tokyo, Japan

Continuation-in-part of Ser. No. 879,606, Jun. 27, 1986, abandoned. This application Nov. 17, 1987, Ser. No. 121,799

Claims priority, application Japan, Jun. 28, 1985, 60-142709

Int. Cl.[4] A61K *7/16, 7/26*

U.S. Cl. 424—49 **19 Claims**

1. A transparent dentifrice composition comprising:

5 to 50% by weight of an abrasive having a refractive index of from 1.43 to 1.46; and

a transparent vehicle having substantially the same refractive index as said abrasive and comprising,

1 to 4% by weight of sodium carboxymethyl cellulose,

1 to 70% by weight of a humectant,

0.1 to 10% by weight of a surface active agent,

0.1 to 5% by weight of a flavor, and

0.001 to 5% by weight of a sweetener,

said sodium carboxymethyl cellulose having a viscosity of 5 to 20 centipoises measured as 1% aqueous solution at 25° C. and having an average degree of substitution of from 0.9 to 1.5.

4,877,603

ORAL COMPOSITIONS

Charles R. Degenhardt, and Barbara A. Kozikowski, both of Cincinnati, Ohio, assignors to The Procter & Gamble Company, Cincinnati, Ohio

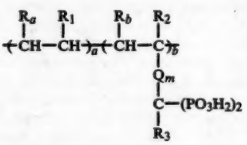
Continuation-in-part of Ser. No. 135,164, Dec. 18, 1987, abandoned. This application Nov. 28, 1988, Ser. No. 276,995

Int. Cl.[4] A61H *7/06*

U.S. Cl. 424—57 **27 Claims**

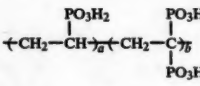
1. An oral care composition formulated for administration to the oral cavity without substantial ingestion, said composition comprising:

(a) a geminal diphosphonate polymer component wherein said component contains one or more geminal diphosphonate polymers selected from the group consisting of polymers containing the following monomeric unit combinations:



(i)

wherein each R_1, R_2, R_a, and R_b can independently be —H, —CO_2H or ester thereof, —PO_3H_2, —C≡N, substituted or unsubstituted aryl, substituted or unsubstituted C_1–C_{10} alkyl, or substituted or unsubstituted C_1–C_{20} oxyalkyl, each R_3 can independently be —H, —OH, amine, or substituted or unsubstituted C_1–C_3 alkyl, each m can independently be 0 or 1, each Q can independently be a substituted or unsubstituted aryl or a substituted or unsubstituted C_1–C_{10} alkylene, and the molar ratio of a/b is greater than or equal to 0 and less than about 30;



(ii)

wherein the molar ratio of a/b is greater than or equal to 0 and less than about 30; and

(iii) polymerization products of

$CH_2{=}CH{-}CH{=}C(PO_3X_2)_2$

wherein each X can independently be —H or a C_1–C_{10} alkyl, and when X is an alkyl, each —PO_3X_2 group is converted to a —PO_3H_2 group subsequent to polymerization; said geminal diphosphonate polymer component having an average molecular weight of between about 1,000 and about 20,000, an average of at least three geminal diphosphonate units per polymer chain, and a molar ratio of monomeric units not containing a geminal diphosphonate to monomeric units containing a geminal diphosphonate of less than about 30; and

(b) a pharmaceutically acceptable carrier; said composition containing between about 0.1 wt. % and about 20 wt. % of said geminal diphosphonate polymer component.

4,877,604

METHOD OF INCORPORATING COSMETIC PIGMENTS AND BASES INTO PRODUCTS CONTAINING OIL AND WATER PHASES

Mitchell L. Schlossman, 454 Prospect Ave., Unit 164, West Orange, N.J. 07052

Filed Sep. 4, 1987, Ser. No. 93,575
Int. Cl.[4] A61K *7/025*
U.S. Cl. 424—64 **2 Claims**

1. A liquid makeup, being smoother and possessing a unique emollient slip when compared to existing liquid make up, the same being comprised of:

	RANGE	
	FROM	TO
lanolin alcohol and/or mineral oil	8.00	12.00
synthetic spermaceti	2.00	4.00
stearic acid (triple pressed)	2.00	4.00
glyceryl monostearate	1.00	3.00
talc treated with titanate coupling agent	1.00	3.00
titanium dioxide	2.00	6.00
iron oxides	0.75	2.85
propylene glycol	10.00	15.00
triethanolamine	0.50	2.00
polysorbate 20	0.40	0.80
magnesium aluminum silicate	0.50	2.00
carboxymethyl cellulose	0.20	0.50
deionized water	50.00	60.00
preservatives and fragrance balance		
		100.0 percent by weight,

where the talc and/or titanium dioxide and iron oxides have been treated with a titanate coupling agent.

4,877,605

FOOT DEODORANT

David Hendricks, Rte. 5, Box 354, Pickens, S.C. 29671

Filed Dec. 12, 1988, Ser. No. 283,546
Int. Cl.[4] A61K *7/32*
U.S. Cl. 424—65 **6 Claims**

1. A foot deodorant, comprising:
boric acid;
hydrogen peroxide;
sodium chloride; and
alcohol;
balance water.

4,877,606

BIODEGRADABLE AMPHIPATHIC COPOLYMERS

Jeffrey R. Churchill, Northwich, and Francis G. Hutchinson, Lymm, both of United Kingdom, assignors to Imperial Chemical Industries PLC, London, England

Division of Ser. No. 747,173, Jun. 21, 1985, Pat. No. 4,745,160.
This application Jan. 19, 1988, Ser. No. 145,116
Claims priority, application United Kingdom, Jun. 26, 1984, 8416234
Int. Cl.[4] A61K *47/00*
U.S. Cl. 424—78 **1 Claim**

1. A process for the manufacture of a frozen, stable aqueous dispersion of a copolymer and a drug, the drug comprising up to 99% by weight of the copolymer plus drug content, and the copolymer comprising a pharmaceutically or veterinarily acceptable amphipathic, non-crosslinked linear, branched or graft block copolymer, which has a minimum weight average molecular weight of 1000, in which the hydrophobic component is biodegradable or hydrolytically unstable under normal physiological conditions, and the hydrophilic component may or may not be biodegradable or hydrolytically unstable under such conditions, characterized by freeze-drying a frozen, stable aqueous dispersion of the copolymer and the drug.

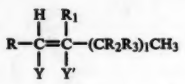
4,877,607

ATTRACTANTS FOR *DACUS LATIFRONS*, THE MALAYSIAN FRUIT FLY

Terrence P. McGovern, Bowie, Md.; Robert A. Flath, Kensington, Calif., and Roy T. Cunningham, Hilo, Hi., assignors to The United States of America as represented by the Secretary of Agriculture, Washington, D.C.

Filed Sep. 22, 1988, Ser. No. 247,546
Int. Cl.[4] A01N *25/00*
U.S. Cl. 424—84 **11 Claims**

1. A method for attracting adult male Malaysian fruit flies, which comprises applying to the locus thereof an effective attractant amount of a compound having the structure


(A)

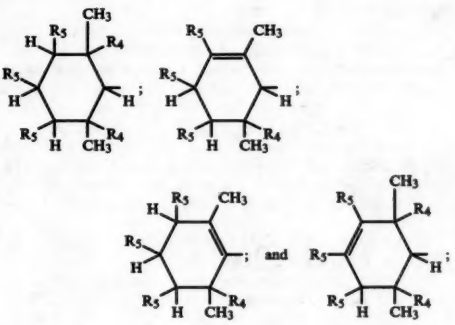
wherein

— represents a single or double bond and Y and Y′ from the carbon-carbon double bond joining the positions to which they are attached if — is a double bond and Y and Y′ are each hydrogen if — is a single bond;

R_1 is H or CH_3;

R1 is H and R2 is OH, or R2 and R3 taken together are =O; and

R is selected from:



wherein

R_4 is H or CH_3,

R_5 is H or CH_3, with the proviso that only one R_5 on the ring is CH_3, and

when Y and Y' are H and R_2 and R_3 taken together are =O, then R is cyclohexenyl.

4,877,608

PHARMACEUTICAL PLASMA PROTEIN FORMULATIONS IN LOW IONIC STRENGTH MEDIA

Ted C. K. Lee, Fairfax, and Michael E. Hrinda, Fairfax Station, both of Va., assignors to Rorer Pharmaceutical Corporation, Fort Washington, Pa.

Filed Nov. 9, 1987, Ser. No. 118,670
Int. Cl.[4] A61K *39/395, 35/16, 37/18*
U.S. Cl. 424—85.8 5 Claims

1. A stable injectable, pharmaceutical plasma protein formulation comprising in an aqueous solution:

a therapeutically effective amount of a plasma protein selected from the group consisting of Factors II, VII, VIII, IX, X, Protein C, Antithrombin III, and gamma globulin;

from about 0.5 mM to about 15 mM sodium chloride, potassium chloride, or mixtures thereof;

from about 0.01 mM to about 10 mM lysine hydrochloride; and

from about 0.2 mM to about 5.0 mM histidine;

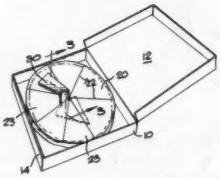
said aqueous solution having a pH of from about 6.0 to about 7.6.

4,877,609

COMBINATION FOOD SERVER AND CONTAINER LID SUPPORT

Dilman A. Beck, and Susan E. Beck, both of 1486 S. Lee Ct., Lakewood, Colo. 80226

Filed Mar. 15, 1988, Ser. No. 168,145
Int. Cl.[4] B65D *85/36*
U.S. Cl. 426—87 18 Claims



1. In combination with a container for food product having a food product therein, the food product container including a base portion and a cover portion defining a space therebetween, a food product container support, said food product container support comprising

a generally horizontally extending server portion positioned underneath a portion of said food product.

an upstanding portion connected to said server portion and extending through said food product having a dimension generally perpendicular to the server portion adequate to support the cover portion of the food product container to prevent the cover portion from collapsing onto the food product therein when the cover portion is subjected to a downward force such as that normally occurring during transport of the food product in the food product container.

13. A method of packaging a relatively flat food product for transport or storage comprising

providing a container, the container having a base portion, a cover portion, and a space adequate to contain the food product therebetween,

providing a container support having a server portion and an upstanding portion,

placing the food product on the base portion in the space between the cover portion and the base portion,

inserting said container support through said food product to place said server portion underneath a portion of said food product and between the cover portion and the base portion whereby a central region of the cover portion is supported thereby and prevented from collapsing onto the top of the food product during ordinary transport or storage, said server portion having a shape and size adequate for serving portions of the food product, and said upstanding portion having a vertical dimension approximately equal to the height of the space between the cover portion and the base portion of the container.

4,877,610

IMMUNOTHERAPEUTIC METHODS AND COMPOSITIONS EMPLOYING ANTIGENS CHARACTERISTIC OF MALIGNANT NEOPLASMS

John McMichael, P.O. Box 81, R.D. 3, Cambridge Springs, Pa. 16403

Division of Ser. No. 692,822, Jan. 19, 1985, Pat. No. 4,692,332. This application Aug. 18, 1987, Ser. No. 86,924
Int. Cl.[4] A61K *39/00, 45/05, 39/40*
U.S. Cl. 424—88 4 Claims

1. A method for alleviating symptoms of feline leukemia or tumors in a diseased feline comprising the steps of:

administering to the diseased feline a member selected from the group consisting of human chorionic gonadotropin and equine chorionic gonadotropin and effective fragments and effective derivatives thereof, in an amount which is less than the lowest amount necessary to provoke a humoral immune response, as exemplified by the presence of a positive wheal upon subcutaneous administration; and

co-administering a lysate of *Staphylococcus aureus* in an amount which is less than the lowest amount necessary to provoke a humoral immune response in combination with the member, as exemplified by the presence of a positive wheal upon subcutaneous administration.

4,877,611

VACCINE CONTAINING TUMOR ANTIGENS AND ADJUVANTS

John L. Cantrell, Corvallis, Mont., assignor to Ribi ImmunoChem Research Inc., Hamilton, Mont.

Continuation-in-part of Ser. No. 852,120, Apr. 15, 1986, Pat. No. 4,806,352. This application Sep. 30, 1987, Ser. No. 102,909
Int. Cl.[4] A61K *39/39, 39/04*
U.S. Cl. 424—88 22 Claims

1. A vaccine useful for the treatment and prevention of tumors in a host, said vaccine comprised of:

(a) at least one tumor-associated antigen,

(b) a refined detoxified endotoxin immunostimulant, and

(c) at least one biological immunostimulant selected from the group consisting of:

(1) mycobacterial cell wall skeleton

(2) trehalose dimycolate, and

(3) pyridine soluble extract of a microorganism, and

(d) a pharmaceutically acceptable carrier.

4,877,612

IMMUNOLOGICAL ADJUVANT AND PROCESS FOR PREPARING THE SAME, PHARMACEUTICAL COMPOSITIONS, AND PROCESS

Frank M. Berger, 190 E. 72nd St., New York, N.Y. 10021; Constantin Bona, New York, N.Y., and Mary P. Lechevalier, Piscataway, N.J., assignors to Frank M. Berger, New York, N.Y.

Continuation of Ser. No. 735,904, May 20, 1985, abandoned. This application Sep. 2, 1986, Ser. No. 902,378

Int. Cl.[4] A61K *39/02*

U.S. Cl. 424—92 22 Claims

1. A process for preparing an immunological adjuvant that when administered to animals increases the immune response to antigens, and that is substantially free from mycolic acids, mycolic acid esters, and lipopolysaccharides, which comprises suspending Amycolata bacteria cells in aqueous saline solution; extracting the cells with an inert organic solvent in which the immunological adjuvant is soluble or dispersible; separating the organic solvent solution from the bacteria cells and the aqueous saline solution; and recovering immunological adjuvant.

4,877,613

PROCESS FOR PREPARING VETERINARY ACELLULAR VACCINES AGAINST GRAM-NEGATIVE NONENTERIC PATHOGENIC BACILLI

Neylan A. Vedros, Alameda, and Te-ning E. Liu, Martinez, both of, assignors to Biotech Connections, Inc., San Leandro, Calif.

Filed Aug. 5, 1987, Ser. No. 81,942

Int. Cl.[4] A61K *39/02;* A07K *3/02, 3/12, 31/24*

U.S. Cl. 424—92 19 Claims

1. Process for preparing an acellular veterinary vaccine against a pathogenic bacilli from an aqueous suspension of the bacilli comprising:

(a) mechanically shearing surface polysaccharide from the outer membrane of the bacteria without damaging the membrane;

(b) separating the bacteria from the suspension to provide a surface polysaccharide-containing supernatant;

(c) adding an organic cationic precipitating agent which does not degrade the surface polysaccharide to the supernatant to form a precipitate comprising an ionic complex of the agent and the surface polysaccharide;

(d) separating the precipitate of (c) from the supernatant;

(e) solubilizing the separated precipitate of (d) in an aqueous medium under conditions which cause the ionic complex to dissociate;

(f) adding a sufficient amount of lower alkanol to the solution of (e) to cause nucleic acids to precipitate therefrom without substantial coprecipitation of the surface polysaccharide;

(g) separating the precipitate of (f) from the solution;

(h) thereafter increasing the concentration of lower alkanol in the solution to a level which causes the surface polysaccharide to precipitate therefrom; and

(i) recovering the surface polysaccharide precipitate of (h).

4,877,614

BIOLOGICALLY ACTIVE FRAGMENTS OF HUMAN ANTIHEMOPHILIC FACTOR AND METHOD FOR PREPARATION THEREOF

Lars-Olof Andersson, Knivsta; Nanna Forsman, Järfälla; Kerstin E. I. Larsen, Lidingö; Annelie B. Lundin, Stockholm; Bohdan Pavlu, Huddinge; Inga H. Sandberg, SpÅnga, and Karin M. Sewerin, Bromma, all of Sweden, assignors to Kabivitrum AB, Stockholm, Sweden

Filed Apr. 25, 1988, Ser. No. 185,629

Claims priority, application Sweden, Mar. 5, 1985, 8501050

Int. Cl.[4] A61K *37/02;* C07K *15/12, 3/18, 3/22*

U.S. Cl. 424—101 14 Claims

2. A method for normalizing hemostasis in hemophilic patients comprising administering a therapeutically effective amount of a Factor VIII fragment selected from the group consisting of:

(a) fragment containing two peptide chains having molecular weights of 90,000 daltons and 80,000 daltons, respectively, and having the aminoterminal amino acid sequences Ala-Thr-Arg-Arg-Tyr-Tyr- and Glu-Ile-Thr-Arg-Thr-Thr-, respectively, and having the aminoacid composition:

	90 kD	80 kD
Cys	1.4	1.3
Asp	6.8	4.7
Asn	4.2	4.5
Thr	5.3	6.1
Ser	7.8	8.3
Glu	6.1	5.7
Gln	3.2	5.7
Pro	5.4	4.5
Gly	5.8	5.7
Ala	5.0	4.8
Val	6.8	5.4
Met	2.6	3.5
Ile	4.7	5.7
Leu	9.6	7.7
Tyr	5.1	4.4
Phe	4.9	5.7
Trp	1.8	2.2
Lys	5.5	5.4
His	3.4	3.5
Arg	4.7	5.0

(b) fragment containing two peptide chains having molecular weight of 115,000 daltons and 80,000 daltons, respectively, and having the aminoterminal sequences Ala-Thr-Arg-Arg-Tyr-Tyr- and Glu-Ile-Thr-Arg-Thr-Thr-, respectively, and having the aminoacid composition:

	80 kD	115 kD
Cys	1.3	1.1
Asp	4.7	6.7
Asn	4.5	4.5
Thr	6.1	6.2
Ser	8.3	9.4
Glu	5.7	5.8
Gln	5.7	3.5
Pro	4.5	6.1
Gly	5.7	5.6
Ala	4.8	4.8
Val	5.4	5.8
Met	3.5	2.6
Ile	5.7	4.4
Leu	7.7	9.9
Tyr	4.4	4.3
Phe	5.7	4.7
Trp	2.2	1.5
Lys	5.4	5.4
His	5.0	3.4
Arg	5.0	4.4

(c) fragment containing two peptide chains having molecular weights of 130,000 daltons and 80,000 daltons, respectively, and having the aminoterminal aminoacid sequences Ala-Thr-Arg-Arg-Tyr-Tyr- and Glu-Ile-Thr-Arg-Thr-Thr-, respectively, and having the aminoacid composition:

	80 kD	130 kD
Cys	1.3	1.0
Asp	4.7	6.5
Asn	4.5	5.0
Thr	6.1	6.3
Ser	8.3	10.0
Glu	5.7	5.9
Gln	5.7	3.3

-continued

	80 kD	130 kD
Pro	4.5	5.8
Gly	5.7	5.6
Ala	4.8	4.6
Val	5.4	5.5
Met	3.5	2.6
Ile	5.7	4.4
Leu	7.7	10.3
Tyr	4.4	3.8
Phe	5.7	4.5
Trp	2.2	1.5
Lys	5.4	5.9
His	3.5	3.3
Arg	5.0	4.3

(d) fragment containing two peptide chains having molecular weights of 150,000 daltons and 80,000 daltons, respectively, and having the aminoterminal sequences Ala-Thr-Arg-Arg-Tyr-Tyr- and Glu-Ile-Thr-Arg-Thr-Thr-, respectively, and having the aminoacid composition:

	80 kD	150 kD
Cys	1.3	0.8
Asp	4.7	6.0
Asn	4.5	5.7
Thr	6.1	6.2
Ser	8.3	9.7
Glu	5.7	6.3
Gln	5.7	3.8
Pro	4.5	5.8
Gly	5.7	5.6
Ala	4.8	4.4
Val	5.4	5.7
Met	3.5	2.7
Ile	5.7	4.3
Leu	7.7	10.1
Tyr	4.4	3.3
Phe	5.7	4.4
Trp	2.2	1.4
Lys	5.4	6.6
His	3.5	3.3
Arg	5.0	4.0

(e) fragment containing two peptide chains having molecular weights of 160,000 daltons and 80,000 daltons, respectively, and having the aminoterminal sequences Ala-Thr-Arg-Arg-Tyr-Tyr- and Glu-Ile-Thr-Arg-Thr-Thr-, respectively, and having the aminoacid composition:

	80 kD	160 kD
Cys	1.3	0.8
Asp	4.7	5.8
Asn	4.5	5.9
Thr	6.1	6.5
Ser	8.3	9.6
Glu	5.7	6.3
Gln	5.7	4.0
Pro	4.5	5.5
Gly	5.7	5.6
Ala	4.8	4.4
Val	5.4	5.5
Met	3.5	2.6
Ile	5.7	4.1
Leu	7.7	10.1
Tyr	4.4	3.3
Phe	5.7	4.5
Trp	2.2	1.3
Lys	5.4	6.8
His	3.5	3.2
Arg	5.0	4.2

(f) fragment containing two peptide chains having molecular weights of 180,000 daltons and 80,000 daltons, respectively, and having the aminoterminal aminoacid sequences Ala-Thr-Arg-Arg-Tyr-Tyr- and Glu-Ile-Thr-Arg-Thr-Thr-, respectively, and having the aminoacid composition:

	80 kD	180 kD
Cys	1.3	0.8
Asp	4.7	5.7
Asn	4.5	5.8
Thr	6.1	6.6
Ser	8.3	10.0
Glu	5.7	6.2
Gln	5.7	4.2
Pro	4.5	5.7
Gly	5.7	5.3
Ala	4.8	4.5
Val	5.4	5.3
Met	3.5	2.4
Ile	5.7	4.4
Leu	7.7	10.0
Try	4.4	3.2
Phe	5.7	4.4
Trp	2.2	1.2
Lys	5.4	6.9
His	3.5	3.2
Arg	5.0	4.3.

4,877,615

ANTIFUNGAL PRODUCT

Peter A. Vandenbergh, Sarasota, and Blair S. Kunka, Bradenton, both of Fla., assignors to Microlife Technics, Inc., Sarasota, Fla.

Filed Sep. 23, 1988, Ser. No. 248,438
Int. Cl.[4] A61K *35/00;* **C12P** *13/08, 7/56, 1/04*
U.S. Cl. 424—115 **2 Claims**

1. An antifungal product (AFP) produced by *Pediococcus acidilactici* ATCC 25742 which comprises a compound consisting of lactic acid and valine having a molecular weight of above 400 daltons and less than about 500 daltons, which is digested by protease, and inhibits *Penicillium oxalicum* as an assay strain in an optimal pH range between about pH 1 and 5 and which has a FAB mass spectrum as shown in FIG. 2.

4,877,616

PROCESS FOR PREPARING XEROSIN II AND XEROSIN III, IMPROVED BIOLOGICAL RESPONSE MODIFIERS

Elizabeth S. Boylan; Robert J. Boylan, both of 66 N. Chatsworth Ave., Larchmont, N.Y. 10538; Vincent Groupe, 7202 Lakeview Largo South - 143rd St. North, Largo, Fla. 34644, and Robert W. Simpson, 261 Amwell Rd., R.D. #1, Neshanic Station, N.J. 08853

Filed Apr. 8, 1988, Ser. No. 179,471
Int. Cl.[4] A61K *35/74*
U.S. Cl. 424—123 **2 Claims**

1. A method for preparing complexes by the purification of acid precipitated material (APM) recovered from cultures of the bacterium *Achromobacter xerosis* and which complexes are effective at a dosage of between about 10.0 to about 25.0 mg/kg of body weight in abating viral pneumonia in mice, the method of purification comprising the steps of:

growing a suitable culture of *Achromobacter xerosis* in a suitable growth medium using minimal agitation to achieve a relatively low oxygen tension;

recovering a water solubilized substance from acid precipitable material isolated from said culture in a conventional manner including a physical disruption of cells of said *Achromobacter xerosis;*

lyophilizing said water solubilized precipitate to dryness from a frozen state;

homogenizing said lyophilized product in distilled water at about pH 9;

heating the resultant solution readjusted to about pH 9 at about 80 degrees C. for about fifteen (15) minutes;

adjusting the solution to about pH 7;
removing insoluble material by centrifugation;
adding sodium sulfate to a final concentration of about 0.02M;
adding cetyltrimethylammonium bromide stock solution to about a 0.3% final concentration;
warming the resultant solution at about 37 degrees C. for about one (1) hour to form a precipitate;
clarifying the solution by centrifugation;
adding cold acetone to form a further precipitate;
collecting said precipitate by centrifugation; and
washing said precipitate with acetone.

4,877,617

FUNGICIDAL AND BACTERICIDAL METHOD

Hajime Namikoshi, and Tatsuo Goto, both of Himeji, Japan, assignors to Daicel Chemical Industries Ltd., Osaka, Japan

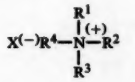
Filed Dec. 9, 1986, Ser. No. 939,704

Claims priority, application Japan, Dec. 11, 1985, 60-278454; Dec. 11, 1985, 60-278455

Int. Cl.[4] A61K *31/70*; A01N *25/34*

U.S. Cl. 424—409 **6 Claims**

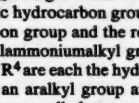
1. A method of imparting fungicidal and bactericidal properties to an article which comprises coating or impregnating the article with a solution of a fungicidal and bactericidal quaternary ammonium salt in an organic solvent or a mixture of the organic solvent and a small amount of water and thereafter removing the solvent from the article, the quaternary ammonium salt being insoluble or sparingly soluble in water and represented by the formula (I)



(I)

wherein $X^{(-)}$ is a group formed by removing a hydrogen ion from at least one carboxyl group of alginic acid or carboxymethylcellulose having 1.5–3.0 as the degree of substitution by carboxymethyl group per anhydrous glucose unit; and R^1 to R^4 are each a C_{1-20} straight-chain or branched saturated or unsaturated aliphatic hydrocarbon group, three of R^1 to R^4 are each the hydrocarbon group and the remaining one is an aralkyl group, a trialkylammoniumalkyl group or an aryloxyalkyl group, two of R^1 to R^4 are each the hydrocarbon group and the remaining two are an aralkyl group and a dialkylpheoxy- or alkylphenoxy-alkyleneoxyalkyl group, or one or two of R^1 to R^4 are the hydrocarbon group and the remaining two or three form a heterocyclic ring together with the nitrogen atom.

5. An article having fungicidal and bactericidal properties, said article being coated or impregnated with a quaternary ammonium salt that is insoluble or sparingly soluble in water and is represented by the formula (I):



(I)

wherein $X^{(-)}$ is a group formed by removing a hydrogen ion from at least one carboxyl group of alginic acid or carboxymethylcellulose having 1.5–3.0 as the degree of substitution by carboxymethyl group per anhydrous glucose unit; and R^1 to R^4 are each a C_{1-20} straightchain or branched saturated or unsaturated aliphatic hydrocarbon group, three of R^1 to R^4 are each the hydrocarbon group and the remaining one is an aralkyl group, a trialkylammoniumalkyl group or an aryloxyalkyl group, two of R^1 to R^4 are each the hydrocarbon group and the remaining two are an aralkyl group and a dialkylphenoxy- or alkylphenoxy-alkyleneoxyalkyl group, or one or two of R^1 to R^4 are the hydrocarbon group and the remaining two or three form a heterocyclic ring together with the nitrogen atom.

4,877,618

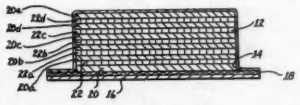
TRANSDERMAL DRUG DELIVERY DEVICE

Fred D. Reed, Jr., Rte. 4, Box 855, Flagstaff, Ariz. 86001

Filed Mar. 18, 1988, Ser. No. 170,427

Int. Cl.[4] A61K *9/68*

U.S. Cl. 424—448 **44 Claims**



1. A transdermal drug delivery device, said device comprising in combination:
(a) a plurality of interlaminar layers for adsorbing the drug to be delivered;
(b) a plurality of adhesive laminae for containing the drug to be delivered interspersed in stacked relationship with said plurality of interlaminar layers, said plurality of adhesive laminae being permeated with the drug to be delivered;
(c) a layer of contact adhesive for securing the stack of said plurality of interlaminar layers and said plurality of adhesive laminae to a user's skin; and
(d) an impermeable covering disposed at least proximate the stack of said plurality of interlaminar layers and said plurality of adhesive laminae for preventing dispersion of the drug to be delivered.

4,877,619

LIPOSOMAL VESICLES FOR INTRAPERITONEAL ADMINISTRATION OF THERAPEUTIC AGENTS

LeRoy L. Richer, San Gabriel, Calif., assignor to Vestar, Inc., Pasadena, Calif.

Continuation-in-part of Ser. No. 900,122, Aug. 25, 1986, abandoned. This application Apr. 6, 1987, Ser. No. 35,065

Int. Cl.[4] A61K *37/22, 9/66*; B01J *13/02*

U.S. Cl. 424—450 **13 Claims**

1. A composition including liposomal multilamellar vesicles suitable for sustained delivery of a therapeutic agent to the peritoneal cavity, said multilamellar vesicles comprising
a lipid component further comprising a phospholipid component selected from the group consisting of phosphatidylcholines having fatty acid side chains of from 12 to 24 carbons in length and
a therapeutic agent incorporated into said vesicles, said vesicles having a size of from about 1 micron to about 15 microns in diameter.

4,877,620

IBUPROFEN-CONTAINING MEDICAMENT

Dieter Loew, Wuppertal; Otto Schuster, and H. Lukas, both of Frankfurt, all of Fed. Rep. of Germany, assignors to MEDICE Chem.- Pharm. Fabrik Pütter GmbH & Co. KG, Iserlohn, Fed. Rep. of Germany

Filed Nov. 10, 1987, Ser. No. 119,028

Claims priority, application Fed. Rep. of Germany, Nov. 14, 1986, 3639038

Int. Cl.[4] A61K *31/19, 31/195*

U.S. Cl. 424—451 **6 Claims**

1. An ibuprofen containing medicament containing only ibuprofen in the (S)-(−)- form without any ibuprofen in the (R)-(−)- form, the medicament being in sustained release form in association with a pharmaceutically acceptable carrier.

4,877,621

COMPOSITIONS FOR COATING FEEDSTUFF ADDITIVES FOR RUMINANTS AND FEEDSTUFF ADDITIVES THUS COATED

Pierre Ardaillon, Saint-Priest; Pierre Autant, Commentry; Paul Bourrain, Dardilly, and Andre Cartillier, Commentry, all of France, assignors to Rhone-Poulenc Sante, Courbevoie, France

Filed Sep. 2, 1987, Ser. No. 92,139
Claims priority, application France, Sep. 4, 1986, 86 12412
Int. Cl.[4] A61K *9/16*
U.S. Cl. 424—498 9 Claims

1. A composition suitable for coating a biologically active substance to be fed to a ruminant, the said composition being stable in a medium with a pH greater than or equal to 5 and enabling the biologically active substance to be released in a medium with a pH less than 3.5, which composition consists essentially of a basic amino copolymer of one or more vinylpyridines with styrene in which the nitrogen content is from 3 to 14% by weight of said copolymer and a hydrophobic substance having a melting point greater than 60° C. selected from fatty acids, fatty esters, fatty alcohols and mixtures thereof, the hydrophobic substance content being from 55 to 90% of the total weight of the said composition.

4,877,622

PROCESS FOR PRODUCING FOOD MATERIAL

Hiroshi Kiuchi, Saitama; Katsumi Murata; Kazuo Murakami, both of Ibaraki; Isao Kusakabe, Chiba, and Hideyuki Kobayashi, Ibaraki, all of Japan, assignors to Kabushikikiaisha Kibun and Kabushikikiaisha Kibun Foodchemifa, both of Tokyo, Japan

Continuation of Ser. No. 32,462, Mar. 31, 1987, abandoned. This application Jan. 13, 1989, Ser. No. 298,287
Claims priority, application Japan, Apr. 2, 1986, 61-074170
Int. Cl.[4] A23J *3/00*
U.S. Cl. 426—46 4 Claims

1. A process for producing food material, which comprises:

reacting protein containing soymilk with a microbially-produced protease at a pH higher than 5.9 and at a temperature higher by at least 4° C. than the optimum temperature of the microbially-produced protease with respect to said reaction, for a reaction time of 10 to 50 minutes, the amount of protease reacted with said milk being sufficient to coagulate said milk protein at said pH and temperature within said reaction time;

separating the thus coagulated protein from the remainder of said milk; and

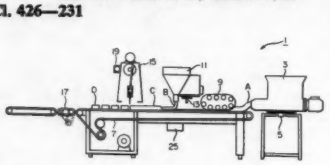
incorporating the thus separated coagulated protein into a food product.

4,877,623

METHOD FOR PRODUCING COMPOSITE FOOD HAVING A CONTROLLED COMPOSITION OF MATERIALS

Torahiko Hayashi, Utsunomiya, Japan, assignor to Rheon Automatic Machinery Co., Utsunomiya, Japan

Filed Jul. 30, 1987, Ser. No. 79,884
Claims priority, application Japan, Jul. 30, 1986, 61-179259
Int. Cl.[4] A21D *8/00;* G01N *33/02*
U.S. Cl. 426—231 1 Claim



1. A method for producing composite food having a controlled composition of materials including the steps of supplying a plurality of raw materials onto a conveyor, combining and forming said raw materials into composite food and cutting the thus formed composite food into separate products comprising:

(a) measuring quantities of said raw materials supplied from a plurality of supply means per unit time,

(b) calculating, with a calculating means, from said quantities measured, the ratio of raw materials in each incremental portion of said composite food and comparing, in a comparator, said ratio with a preselected ratio value, and

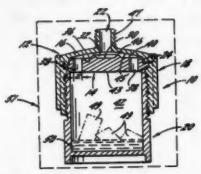
(c) selecting, with a selecting means, products having ratios within a preselected range of said preselected ratio value from separate products not having ratios within said preselected range of said preselected ratio value.

4,877,624

DIGESTION AND STERILIZATION METHODS AND APPARATUS

Terry S. Floyd, Clover, S.C., and Wyatt P. Hargett, Jr., Matthews, N.C., assignors to CEM Corporation, Matthews, N.C.

Continuation of Ser. No. 851,785, Apr. 14, 1986, abandoned, which is a division of Ser. No. 722,266, Apr. 11, 1985, abandoned. This application Apr. 19, 1988, Ser. No. 185,250
Int. Cl.[4] A23L *3/00, 3/26;* F16K *15/14*
U.S. Cl. 426—241 9 Claims



1. Digestion or sterilization apparatus which comprises a microwave system comprising a microwave heating means, and a lidded vessel comprising a container and a self-opening and self-closing temperaturesensitive valve assembly, said valve assembly being made entirely of microwave radiation transparent, thermoplastic material, and said valve assembly comprising a temperaturesensitive, pressure-deformable, resilient wall member located for direct contact with a hot gas when said lidded vessel is closed, said wall member having an outlet port, and obstructing means normally engaged to block outflow through said outlet port such that said lidded vessel is closed, said wall member being only dome-shaped or planar; wherein said valve assembly is structured so that internal fluid pressure impinging on said wall member, causes outward bulging of said wall member, the pressure-deformed wall member being domeshaped, wherein outflow through said outlet port occurs in response to a certain internal fluid pressure impinging on and deforming said wall member; and wherein said valve assembly lacks a coil spring member.

7. A high pressure, closed vessel digestion method comprising

(a) introducing sample to be digested, and an amount of a digesting agent suitable for effecting digestion into a thermoplastic container capable of withstanding high internal pressure;

(b) placing onto said container, a self-opening and self-closing temperature-sensitive valve assembly, said valve assembly being made entirely of microwave radiation transparent, thermoplastic material, and said valve assembly comprising a temperature-sensitive, pressure-deformable, resilient wall member located for direct contact with a hot gas when said lidded vessel is closed, said wall member having an outlet port, and obstructing means normally engaged to block outflow through said outlet port such that said container is closed, said wall member being only

dome-shaped or planar; wherein said valve assembly is structured so that internal fluid pressure impinging on said wall member, causes outward bulging of said wall member, the pressure-deformed wall member being dome-shaped, wherein outflow through said outlet port occurs in response to a certain high internal fluid pressure impinging on and deforming said wall member; and wherein said valve assembly lacks a coil spring member;

(c) digesting said sample by applying microwave energy to the contents of the closed container, wherein a high internal fluid pressure is produced that causes outward bulging of said wall member yet said valve assembly remains closed, said high internal fluid pressure being less than said certain high internal fluid pressure; and

(d) recovering the digested sample from said container.

4,877,625

PROCESS FOR PRODUCING A SWEET CUSTARD FOODSTUFF WITH A LONG TERM SHELF LIFE BASED ON MILK AND EGGS

Bernard Dieu, and Jean CuQ, both of Onet Le Chateau, France, assignors to Valmont S.A., Montauban, France

Filed Jan. 15, 1988, Ser. No. 144,261

Claims priority, application France, Jan. 5, 1987, 87 00486

Int. Cl.[4] A23L *1/187, 1/32*

U.S. Cl. 426—250 **2 Claims**

1. A process for producing a sweet custard foodstuff consisting of milk, eggs and at least one additional ingredient selected from the group consisting of sugar, modified starch, flavors, colorants and stabilizers comprising the steps of:

mixing a mixture consisting of milk, eggs and at least one of said additional ingredients at a temperature between 10° and 40° C.,

preheating said mixed milk mixture to a temperature between 60°–90° C.,

sterilizing by increasing the temperature to between 100°–160° C. for 1 to 10 seconds by direct steam injection, thereby achieving sterility without prolonged cooking,

cooling through evaporation under partial vacuum of water injected as steam to an intermediate temperature between 60°–90° C.,

homogenizing under aseptic conditions at said intermediate temperature, and

filling under aseptic conditions.

4,877,626

METHOD FOR COLORING MEAT

Charles F. Ande, and Mark E. Selz, both of Sun Prairie, Wis., assignors to Oscar Mayer Foods Corporation, Madison, Wis.

Filed Jan. 15, 1988, Ser. No. 144,290

Int. Cl.[4] A23L *1/275*

U.S. Cl. 426—250 **18 Claims**

1. A method for coloring raw meat which comprises coating raw meat muscle surface or raw meat skin wherein the meat is selected from the group consisting of poultry, red meat and fish with a coloring solution comprising liquid smoke and caramel wherein the coloring solution contains from 40% to 99% liquid smoke and from 1% to 30% caramel and then cooking and packaging the coated meat; thereby obtaining a raw uncooked meat having a uniform fixed dark color.

4,877,627

BALANCED FIBER COMPOSITION

Richard E. A. Leitz, and Donald J. Pusateri, both of Hemet, Calif., assignors to Nutrilite Products, Inc., Buena Park, Calif.

Filed Aug. 19, 1986, Ser. No. 898,056

Int. Cl.[4] A23L *1/29*

U.S. Cl. 426—285 **12 Claims**

1. A nutritional high fiber composition for ingestion by mammalian organisms to provide an adjunct to the diet without serious risk of inducing disorders in the organism, said composition comprising approximately 30 to 48.5% fiber derived from the fruit and vegetable groups, based on the total weight of fiber in the composition, wherein at least one of the fibers from the fruit and vegetable group is selected from the group consisting of lemon, acerola and carrot, approximately 30 to 48.5% fiber derived from the cereal group, wherein at least one of the fibers from the cereal group is selected from the group consisting of corn bran, barley bran and oat bran, and approximately 3 to 40% fiber from fiber sources other than the fruit, vegetable and cereal groups, wherein at least one of the fibers from other than the fruit, vegetable and cereal groups is selected from the group consisting of soybean bran, psyllium seed husk and guar gum, and wherein at least 10% of the total dietary fiber is soluble dietary fiber.

4,877,628

PROCESS FOR PREPARING A COATED FOOD PRODUCT

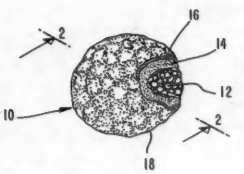
Richard J. Stypula, Colts Neck, N.J., assignor to International Flavors & Fragrances Inc., New York, N.Y.

Division of Ser. No. 93,352, Sep. 3, 1987, abandoned. This application Jun. 10, 1988, Ser. No. 205,357

The portion of the term of this patent subsequent to Oct. 31, 2006, has been disclaimed.

Int. Cl.[4] A23L *1/314, 1/315, 1/317*

U.S. Cl. 426—302 **7 Claims**



1. A process for preparing a product consisting of the steps of:

(1) providing a porous inner food structure consisting of a mixture of water and macerated beef or macerated chicken meat;

(2) admixing a starch, methyl cellulose and xanthan gum to provide a barrier mixture;

(3) providing a batter comprising flour and water;

(4) coating the barrier mixture onto the porous inner food structure thereby forming a barrier-coated porous inner food structure;

(5) baking the resulting barrier-coated porous inner food structure to form a baked product;

(6) coating the batter onto the resulting baked product to form a battered, baked product; and

(7) baking the resulting battered, baked product whereby a food product is produced having the properties of:

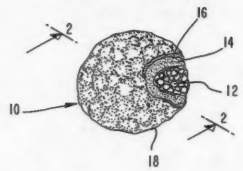
(x) retention of a substantial quantity of the water originally contained in the porous inner food structure on storage and/or on cooking; and

(y) substantial imperviousness to the absorption or adsorption of cooking oil into said porous inner food structure when said article is contacted with cooking oil on storage and/or on cooking.

4,877,629
PROCESS FOR PREPARING A COATED FOOD PRODUCT

Richard J. Stypula, Colts Neck, and Lawrence Buckholz, Jr., Jackson, both of N.J., assignors to International Flavors & Fragrances Inc., New York, N.Y.

Filed Jun. 10, 1988, Ser. No. 205,358
The portion of the term of this patent subsequent to Oct. 31, 2006, has been disclaimed.
Int. Cl.[4] A23L *1/314, 1/315, 1/317*
U.S. Cl. 426—302 **7 Claims**

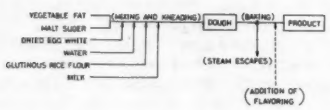


1. A process for preparing a food product consisting of the steps of:
(1) providing a porous inner food structure consisting of a mixture of water and macerated beef or macerated chicken meat;
(2) admixing a starch, methyl cellulose, xanthan gum and one or more reaction flavor compositions and/or reaction flavor precursor compositions to provide a barrier mixture;
(3) providing batter comprising flour and water;
(4) coating the barrier mixture onto the porous inner food structure thereby forming a barrier-coated porous inner food structure;
(5) baking the resulting barrier-coated porous inner food structure to form a baked product;
(6) coating the batter onto the resulting baked product to form a battered baked product; and
(7) baking the resulting battered, baked product whereby a food product is produced having the properties of:
(x) retention of a substantial quantity of the water originally contained in the porous inner food structure on storage and/or on cooking;
(y) substantial imperviousness to the absorption or adsorption of cooking oil into said porous inner food structure when said article is contacted with cooking oil on storage and/or on cooking; and
(z) retention of substantially all of the flavor nuances originally present in the macerated chicken meat or macerated beef.

4,877,630
RICE COOKIE AND METHOD FOR PRODUCING SAME

Tetsuro Okayama, Kobe, Japan, assignor to Uegaki Beika Kabushiki Kaisha, Kobe, Japan

Filed Jun. 10, 1988, Ser. No. 205,455
Claims priority, application Japan, Jun. 19, 1987, 62-154182
Int. Cl.[4] A21D *8/00;* **A23L** *1/10*
U.S. Cl. 426—302 **5 Claims**



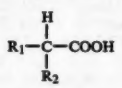
1. A rice cookie comprising a glutinous rice flour as the main ingredient, and oil or fat, sweetener, and egg white mixed with said flour, the amount of oil or fat being approximatey half of the weight of said flour, and liquid containing milk products equalling 35–45% in total weight of the aforementioned ingredients being added to make a dough which is then baked.

4,877,631
PROCESS FOR RECOVERING CAFFEINE ABSORBED IN ACTIVATED CARBON, AND A PROCESS FOR DECAFFEINATING COFFEE

Louris Kaper, Barneveld; Roelof Klamer, and Pieter J. Noomer, both of Utrecht, all of Netherlands, assignors to Douwe Egberts Koninklijke Tabaksfabriek-Koffiebranderijen-Theehandel N.V., Utrecht, Netherlands

Filed Jun. 1, 1987, Ser. No. 55,850
Claims priority, application Netherlands, May 30, 1986, 8601400; May 30, 1986, 8601401; Jul. 8, 1986, 8601783
Int. Cl.[4] A23F *5/22;* **C07D** *473/12*
U.S. Cl. 426—422 **16 Claims**

1. A process for recovering caffeine from caffeine-loaded activated carbon by treatment of the loaded carbon with an acid, comprising the steps of treating the activated carbon with benzoic acid or a compound having the formula

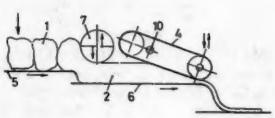


wherein R_1 is methyl, H or Cl, and R_2 is Cl, OH or phenyl.

4,877,632
PROCESS FOR THE PRODUCTION BY CONTINUOUS ROLLING OF A MASS OF DOUGH FOR BAKERY PRODUCTS AND BUNS AND ROLLS

José M. Vinas I Nogueroles, Mataro, Spain, assignor to Sermont, S.A. and Construcciones Mecanicas AGMI, S.A., both of Barcelona, Spain

Division of Ser. No. 66,237, Jun. 25, 1987. This application Aug. 18, 1988, Ser. No. 233,433
Claims priority, application Spain, Jun. 25, 1986, 556955
Int. Cl.[4] A21C *3/02*
U.S. Cl. 426—502 **1 Claim**



1. A method of producing by continuously rolling a mass of dough for bakery products, buns and rolls comprising:
conveying a plurality of lumps of dough on a conveying means along a conveying path;
conveying said lumps of dough to a roller means for regulating the amount of dough conveyed along said conveying path;
intermittently driving said conveying means to intermittently convey the dough downstream of said roller means; and
intermittently bearing the dough downstream of said roller means so that said dough is beaten when said conveying means is at rest to compress the dough into a continuous strip of reduced thickness with a beating member mounted vertically above said conveying means so as to define a gap therebetween that decreases in the direction of conveyance, said beating member being pivotally mounted at one longitudinal end thereof and operatively coupled at the other longitudinal end thereof to a means for reciprocally moving said other end toward and away from said conveying means to intermittently urge at least a portion

of said beating member into compressing contact with dough disposed on said conveying means.

4,877,633

PROCESS FOR IMPROVING THE COLOR OF PRAWNS, SHRIMP AND LOBSTERS

Yer-Lee Ko, No. 2, 11th Floor, Alley 9, Lane 38, Lin-Chuan St., Ling-Ya Dist., Kaohsiung, Taiwan

Filed Sep. 8, 1988, Ser. No. 242,313
Int. Cl.[4] A22C *29/02*
U.S. Cl. 426—506 1 Claim

1. A process for improving the color of prawns, shrimps and lobsters, comprising the successive steps of:

(a) quick-freezing the raw prawns, shrimps or lobsters until the core temperature of same is reduced to about −25° C.;

(b) heating the quick-frozen prawns, shrimps or lobsters at between about 90° to 100° C. for about 20 to 40 seconds; and

(c) cooling the heated prawns, shrimps or lobsters with cold water to a temperature of about 4° C. immediately after step (b).

4,877,634

FOOD PRODUCT CONTAINING NOVEL DRIED COMPOSITIONS WITH POLYSACCHARIDES

Michael J. Pucci, Sarasota, and Blair S. Kunka, Bradenton, both of Fla., assignors to Microlife Technics, Inc., Sarasota, Fla.

Division of Ser. No. 68,435, Jul. 1, 1987, Pat. No. 4,855,149.
This application Aug. 31, 1988, Ser. No. 238,415
Int. Cl.[4] A23C *9/154;* A23G *9/00;* A23L *1/24*
U.S. Cl. 426—531 7 Claims

1. A food product which comprises in admixture:

(a) a food which is a mixture of ingredients and

(b) a quality improving amount of a dried composition which comprises in admixture a drying aid and polysaccharides derived by fermenting an aqueous growth medium comprising sucrose with a Leuconostoc dextranicum which produces the polysaccharides which are substantially rehydratable from the sucrose until the sucrose is substantially depleted and then drying the aqueous mixture to a powder with the drying aid, wherein the quality improvement is in thickness, stability or texture of the food product.

4,877,635

HERB FLAVORING AND/OR ANTIOXIDANT COMPOSITION AND PROCESS

Paul H. Todd, Jr., Kalamazoo, Mich., assignor to Kalamazoo Holdings, Inc., Kalamazoo, Mich.

Continuation of Ser. No. 811,514, Dec. 20, 1985, abandoned.
This application Oct. 21, 1987, Ser. No. 111,918
Int. Cl.[4] A23L *1/28, 1/221*
U.S. Cl. 426—542 19 Claims

1. A process for producing a natural antioxidant extract of a Labiatae herb having superior antioxidant activity, which is oil-soluble and which contains essentially all of the antioxidant factors of the natural herb, and which contains less than 7.5% by weight of substances, comprising pro-oxidant substances, which are insoluble in acetone when the extract is diluted to a 15% w/v concentration in acetone at about 20° C., which consists essentially of the steps of:

A. Providing an extract of Labiatae herbal material in an approved food-grade organic solvent which contains essentially all of the antioxidant factors of the natural herbal material,

B. Removing the solvent to a concentration of about 5 to 50% of the extract in the remaining solvent, until the solvent is no more than about twenty times the weight of the extract, thereby effecting a concentration of between about 5% and 50% of the extract in such solvent,

C1. In case the solvent employed is acetone or methylethyl ketone, allowing the solvent and extract mixture to stand until insoluble material precipitates, removing the precipitate, and then removing solvent from the remaining natural antioxidant extract, and

C2. In case the solvent employed is not acetone or methylethyl ketone, adding sufficient acetone or methylethyl ketone to precipitate insoluble material and allowing the solvent and extract mixture to stand until insoluble material precipitates, removing the precipitate, and then removing solvent from the remaining natural antioxidant extract.

4,877,636

CHOCOLATE AND CHOCOLATE ADDITIVE

Tetsuo Koyano, Kawasaki; Nobuo Sagi, Sakai; Tsugio Izumi, Sennan; Setsuya Fujita; Tadahiko Murata, both of Yokohama; Iwao Hachiya, Yokohama, and Hiroyuki Mori, Sakai, all of Japan, assignors to Meiji Seika Kaisha, Ltd., Tokyo and Fuji Oil Company, Limited, Osaka, both of, Japan

Filed Oct. 28, 1987, Ser. No. 113,762
Claims priority, application Japan, Nov. 11, 1986, 61-269393; May 29, 1987, 62-136530
Int. Cl.[4] A23D *5/00;* A23G *1/00*
U.S. Cl. 426—607 3 Claims

1. A chocolate additive for preventing fat blooming and useful for omitting or simplifying the tempering operation comprising powder particles composed of at least 50% by weight of 2-unsaturated-1,3-disaturated glyceride constituent fatty acids of which are unsaturated fatty acids having at least 18 carbon atoms and saturated fatty acids having 20 to 24 carbon atoms, said particles being in a stable crystal form of at least the V form of the glyceride and having an average particle size of not more than 500 μ, and wherein said additive is to be used for addition during solidification of chocolate with cooling in chocolate production.

4,877,637

METHOD OF TREATING SOYBEANS

Emogene Harp, R. R. 1, Box 99, Marienthal, Kans. 67863

Filed Jun. 8, 1988, Ser. No. 203,898
Int. Cl.[4] A23L *1/20*
U.S. Cl. 426—634 17 Claims

11. A process for making soybeans palatable and readily digestible, comprising the steps of:

(a) soaking soybeans in water having a temperature of from 80° F. to 155° F., said soaking being from 1 to 20 hours and until said soybeans comprise 10% to 80% by weight water;

(b) removing the soaked soybeans of step (a) from the water;

(c) drying the removed soybeans of step (b) from 1 to 20 hours and until said soybeans comprise 1% to 40% by weight water;

(d) freezing the dried soybeans of step (c);

(e) disposing the frozen soybeans of step (d) in a hot oil bath having a temperature of from about 150° F. to about 500° F. to heat the frozen soybeans and cause the soybeans to start popping and cracking;

(f) stirring said frozen soybeans immediately after said disposing step (e) in order that the hot oil surrounds each soybean;

(g) continuing to heat the soybeans for 5 minutes to 50 minutes after said disposing step (e) and until the soybeans have stopped popping and cracking; and

(h) removing the heated soybeans of step (g) from the hot oil bath.

4,877,638

METHODS FOR GRIT BLASTING WITH A U.V. DETECTABLE MATERIAL

Howard L. Novak, Satellite Beach, and Lee M. Zook, Titusville, both of Fla., assignors to USBI Company, Huntsville, Ala.

Filed Jun. 13, 1988, Ser. No. 206,468
Int. Cl.[4] B05D 1/12
U.S. Cl. 427—8 **3 Claims**

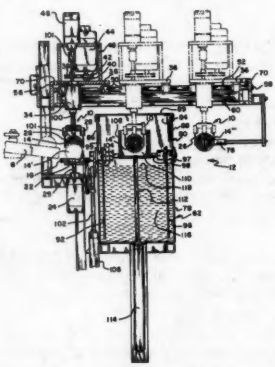
1. A method of detecting cracks on the surface of an article after removal of a coating comprising:
(a) incorporating a U.V. detectable compound in a thermoset or thermoplastic grit blast media;
(b) grit blasting the coated article to remove the coating; and
(c) exposing the surface of the article to U.V. radiation to detect grit blast media trapped in surface cracks thereby detecting the surface cracks.

4,877,639

COATING METHOD

Karel S. Willemsens, Berchem; Willy N. V. Abbeneyen, Merksem, and Frans B. Criel, 's-Gravenwezel, all of Belgium, assignors to Agfa-Gevaert N.V., Mortsel, Belgium

Filed Jun. 29, 1988, Ser. No. 213,112
Claims priority, application European Pat. Off., Jul. 21, 1987, 87201378.4
Int. Cl.[4] B05D 1/26, 1/30, 1/34
U.S. Cl. 427—13 **11 Claims**



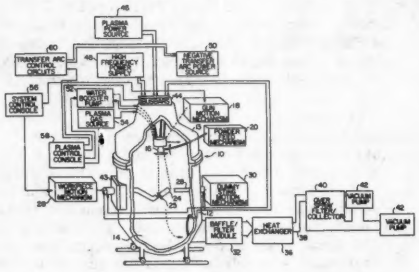
1. A method of coating a moving web with a composite liquid layer consisting of at least two distinct superimposed liquid layers with different viscosities including at least one relatively high viscosity layer and at least one relatively low viscosity layer, by moving the web adjacent and relative to a coating device, producing in the coating device distinct liquid layers and superimposing said liquid layers onto each other to form one composite layer having a low viscosity layer on the side opposite the web, discharging the composite layer from the coating device onto said web to form and maintain a bead of liquid composition between a lip of the coating device and the moving web, and subjecting the bead of liquid coating composition to a differential air pressure to withhold the bead from movement in the direction of travel of the web, the air pressures being selected to retain the bead of coating composition in a coating position between the coating device and the web and to maintain a uniform coating on the web, the higher air pressure being on the side of the bead remote of the web, in which method the coating is pre-started by establishing a distance between the coater and the web which is greater than the normal coating gap and forming a flowing stream of said distinct liquid layers, characterised in that the coating is started by,
reducing to zero the rate of flow of at least that high viscosity layer proximate said web,
reducing the distance between the coater and the web to at most the normal coating gap and initiating the wetting of the web by one such lower viscosity layer distant from said web, and
then adjusting the rates of flow of the liquid layers to their normal coating values.

4,877,640

METHOD OF OXIDE REMOVAL FROM METALLIC POWDER

Erich Muehlberger, San Clemente, and Albert Sickinger, Irvine, both of Calif., assignors to Electro-Plasma, Inc., Irvine, Calif.

Filed Apr. 13, 1988, Ser. No. 181,400
Int. Cl.[4] B05D 1/08
U.S. Cl. 427—34 **12 Claims**



1. A method of cleansing metal particles of oxides comprising the steps of:
generating a plasma stream;
locating a cathode within the plasma stream;
continuously maintaining a negative transfer arc in conjunction with the plasma stream along a portion of the plasma stream extending to the cathode;
introducing metal particles into the plasma stream; and
receiving the metal particles after they have traveled along said portion of the plasma stream.

4,877,641

PROCESS FOR PLASMA DEPOSITING SILICON NITRIDE AND SILICON DIOXIDE FILMS ONTO A SUBSTRATE

Thomas S. Dory, New Haven, Conn., assignor to Olin Corporation, Cheshire, Conn.

Filed May 31, 1988, Ser. No. 200,202
Int. Cl.[4] B05D 3/02, 3/06; C23C 16/30
U.S. Cl. 427—38 **24 Claims**

1. A plasma CVD process for forming silicon nitride film having a refractive index from about 2.0±0.2 or silicon dioxide

film having a refractive index from about 1.46±0.2 a substrate comprising the steps of:

(a) introducing di-tert-butylsilane and at least one other reactant gas capable of reacting with said di-tert-butylsilane to form either silicon nitride or silicon dioxide into a CVD reaction zone containing said substrate on which either a silicon nitride or silicon dioxide film is to be formed;

(b) maintaining the temperature of said zone and said substrate from about 100° C. to about 350° C.;

(c) maintaining the pressure in said zone from about 0.1 to about 5 Torr; and

(d) passing said gas mixture into contact with said substrate while exciting said gas mixture with a plasma for a period of time sufficient to form a silicon from about 2.0 ±0.2 or silicon dioxide film having a refractive index from about 1.46 ±0.2 on said nitride film having a refractive index substrate, wherein said plasma is excited by a RF power at about 10 to 500 Watts.

4,877,642

METHOD OF MANUFACTURING ELECTRICALLY CONDUCTIVE MOLDED BODIES BY PLASMA-ACTIVATED CHEMICAL DEPOSITION FROM THE GASEOUS PHASE

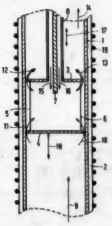
Georg F. Gärtner, Aachen, and Hans-Jürgen Lydtin, Stolberg, both of Fed. Rep. of Germany, assignors to U.S. Philips Corp., New York, N.Y.

Filed Jul. 2, 1987, Ser. No. 69,476

Claims priority, application Fed. Rep. of Germany, Jul. 5, 1986, 3622614

Int. Cl.[4] B05D 3/06, 5/12, 7/22

U.S. Cl. 427—38 **13 Claims**



13. A method of manufacturing a shaped body of at least an electrically conductive material by a plasma-activated chemical deposition of the material, from a gaseous phase comprising at least a starting compound of the material, onto a substrate consisting of a second electrically conductive material which substrate is then removed from the deposited material after completion of deposition of the material wherein:

(a) the gaseous phase of an electrically conductive material is introduced into a reaction space formed as a microwave cavity resonator whose inner wall comprises at least a part of the substrate on which the electrically conductive material is deposited;

(b) the microwaves are applied at a site in the reaction space which is kept free from growing layers of electrically conductive material;

(c) the microwaves produce a standing microwave field in the reaction space; and

(d) electrically conductive material is deposited on the inner wall of said resonator

wherein deposition rates are obtained that are substantially higher than those obtained when said microwave cavity resonator does not comprise at least a part of the substrate on which the electrically conductive material is deposited.

4,877,643

PROCESS FOR PRODUCING PREFORMED WIRE FROM SILICON CARBIDE FIBER-REINFORCED ALUMINUM

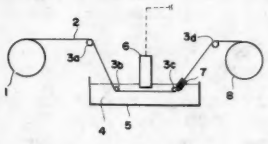
Toshikatsu Ishikawa, Tokyo; Katsuya Tokutomi, Yokosuka, and Yoshikazu Imai, Tokyo, all of Japan, assignors to Director General Agency of Industrial Science and Technology, Tokyo, Japan

Filed Dec. 30, 1988, Ser. No. 292,465

Claims priority, application Japan, Mar. 24, 1988, 63-68100

Int. Cl.[4] B05D 3/12

U.S. Cl. 427—57 **2 Claims**



1. A process for producing a preformed wire from silicon carbide fiber-reinforced aluminum, characterized by spreading and arranging in order a bundle of silicon carbide fibers and continuously dipping said fiber bundle for a period of 60 seconds or shorter in a melt of a eutectic alloy composed of aluminum and 5.0 to 7.0 wt. % of nickel added thereto which melt is kept at or below the liquidus temperature of the melting point thereof plus 50° C. to impregnate said fiber bundle with said alloy.

4,877,644

SELECTIVE PLATING BY LASER ABLATION

Jeff C. Wu, Clemmons; Richard T. Williams, Winston-Salem; John R. Rowlette, Clemmons; Charles P. Brooks, Winston-Salem, all of N.C., and Richard H. Zimmerman, Bradenton, Fla., assignors to AMP Incorporated, Harrisburg, Pa.

Filed Apr. 12, 1988, Ser. No. 180,417

Int. Cl.[4] B05D 3/06

U.S. Cl. 427—53.1 **12 Claims**

1. In a method for the selective plating of a metal substrate where a think polymeric plating resist is first applied to said substrate, followed by selective laser ablation of said resist to expose portions of said substrate to plating, the improvement comprising in combination therewith the steps of

(a) correlating the operating parameters and character of said laser with said resist and said substrate,

(i) selecting abating substrate having a low reflectance, at normal incidence of less than about 70%,

(ii) selecting a polymer based plating resist for application to said substrate, including but not limited to said por-

tions, and having an optical coefficient of absorption, no greater than about 1000 cm^{-1} for a 3 micron film thickness,

(iii) curing said resist on said substrate,

(iiii) subjecting selective areas of said resist to and excimer laser shot, having a wavelength between about 248 to 360 nm, whereby a potion of the laser energy is transmitted through said resist to be absorbed by said substrate, resulting in said metal substrate being heated at the surface thereof to heat and vaporize the adjacent layer of said resist, said vaporized resist expanding causing the solid resist thereover to lift off exposing a clean metal substrate suitable for metal plating, and

(b) subjecting said exposed portions of said substrate to metal plating.

4,877,645

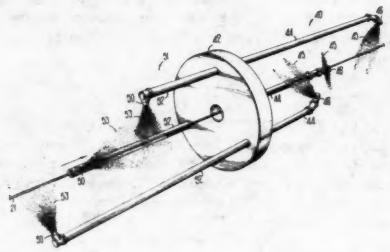
METHODS OF AND APPARATUS FOR APPLYING A COATING MATERIAL TO ELONGATED MATERIAL

Larry L. Bleich, Omaha, Nebr.; Joni A. Roberts, Stone Mountain, Ga., and Stephen T. Zerbs, Gretna, Nebr., assignors to American Telephone & Telegraph AT&T Technologies, Inc., Berkeley Heights, N.J.

Filed Feb. 26, 1988, Ser. No. 160,891

Int. Cl.[4] B05D *5/06, 7/00*

U.S. Cl. 427—117 **13 Claims**



1. A method of applying a coating material to the outer surface of an elongated material, said method comprising the steps of:

causing relative motion between the elongated material and a source of coating material along a path of travel in a direction parallel to the longitudinal axis of the elongated material by moving the elongated material along the path of travel; while

directing each of a plurality of spray patterns of the coating material which comprise a first group toward the elongated material in such a manner that the coating material of each spray pattern of the first group is distributed in a generally conical configuration; and then

directing each of a plurality of spray patterns of the coating material which comprise a second group toward the moving elongated material in such a manner that the coating material of each one of the spray patterns of the second group has a substantially planar distribution as the coating material of each spray pattern of the second group is directed into engagement with the elongated material and such that the direction of each of the spray patterns of the second group is at a predetermined angle to the path of travel with the direction of each of the spray patterns of the second group having a horizontal component in a direction opposite to the direction in which the elongated material is moved, the spray patterns of said second group being staggered along and spaced generally equangularly about the path of travel and cooperating to prevent unintended undulations of the moving elongated material as coating material is applied thereto, the second group being spaced from the first group in a direction along the path of travel.

4,877,646

METHOD FOR MAKING ELECTRICALLY CONDUCTIVE TEXTILE MATERIALS

Hans H. Kuhn, Spartanburg, and William C. Kimbrell, Jr., Inman, both of S.C., assignors to Milliken Research Corporation, Spartanburg, S.C.

Filed Jun. 27, 1988, Ser. No. 211,630

Int. Cl.[4] B05D *3/02, 5/12*

U.S. Cl. 427—121 **19 Claims**

1. A method for imparting electrical conductivity to a textile material, which comprises: (a) contacting the textile material with an aqueous solution of an oxidatively polymerizable pyrrole compound and an oxidizing agent capable of oxidizing said compound to a polymer, said contacting being carried out in the presence of a counter ion or doping agent which imparts electrical conductivity to said polymer when fully formed, said contacting being under conditions at which the pyrrole compound and the oxidizing agent react with each other to form a prepolymer in said aqueous solution; (b) depositing onto the surface of the textile material the prepolymer of the polymerizable compound; and (c) allowing the prepolymer to polymerize while deposited on the textile material so as to uniformly and coherently cover the textile material with a conductive film of polymerized compound; the improvement wherein in step (a) a ferric salt is used as the oxidizing agent and a weak complexing agent for ferric ions is included in the aqueous solution, in an amount sufficient to effectively control the polymerization rate of steps (b) and (c) such that the prepolymer is uniformly and coherently adsorbed onto the surface of the textile material while effectively avoiding undesired formation of polymer in solution.

4,877,647

METHOD OF COATING SUBSTRATES WITH SOLVATED CLUSTERS OF METAL PARTICLES

Kenneth J. Klabunde, Manhattan, Kans., assignor to Kansas State University Research Foundation, Manhattan, Kans.

Continuation-in-part of Ser. No. 20,581, Mar. 2, 1987, abandoned, which is a continuation-in-part of Ser. No. 853,027, Apr. 17, 1986, abandoned. This application May 2, 1988, Ser. No. 189,221

Int. Cl.[4] B05D *5/12*

U.S. Cl. 427—123 **12 Claims**

1. The method of forming a continuous metal coating on a substrate, comprising the steps of:

(a) preparing a stable colloidal dispersion of solvated clusters of metal atoms in a polar organic solvent by capturing and complexing vaporized metal in said solvent as a frozen matrix and gradually warming said solvent to room temperature without precipitating the captured metal atoms, said metal being selected from the metals having atomic numbers 21 to 32, 39 to 50, and 71 to 82;

(b) contacting the substrate to be coated with said stable dispersion while evaporating said solvent therefrom, said solvent evaporation causing said dispersion to become unstable with progressive precipitation of solvated metal clusters as the evaporation proceeds, the precipitated solvated metal clusters depositing on said substrate; and

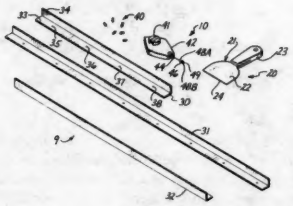
(c) continuing said contacting and solvent evaporating until a continuous layer of the solvated metal clusters is formed on the substrate, the continuity of said layer being indicated by its electrical conductivity.

4,877,648

KIT AND METHOD FOR USING KIT TO RE-FINISH PLASTERED CONSTRUCTIONS

Santiago Sotelo, 12105 S. Hamilton, Alsip, Ill. 60658

Filed Apr. 22, 1988, Ser. No. 184,766
Int. Cl.[4] B32B *35/00*
U.S. Cl. 427—140 11 Claims



1. A method of refinishing an irregular, uneven joint of an open-angle construction to form a substantially straight-line, which comprises:

applying a coating of marking material over the uneven joint, said coating being configured in a first thin straight line;

subsequently applying a coating of marking material configured in a second straight line parallel to the first line at a distance substantially equal to the width of the blade of a tool;

attaching temporarily to the construction surface, guide means having a straight-line edge super-imposed in alignment with the second line;

applying with the tool blade to the construction between the guide edge and the uneven open angle a coating of a refinishing material; and

removing the guide, whereby the uneven open-angle is replaced by a straight line joint.

4,877,649

COATING OF BORON PARTICLES

John C. Trowbridge, Saratoga, Calif., and Jack D. Breazeale, Koloa, Hi., assignors to United Technologies Corporation, Hartford, Conn.

Filed Sep. 8, 1987, Ser. No. 93,938
Int. Cl.[4] B05D *7/00*; C23C *16/32*
U.S. Cl. 427—215 5 Claims

1. A method of improving the combustion performance of boron comprising reacting boron particles in the absence of a halide and oxygen with a low molecular weight hydrocarbon gas selected from the group consisting of alkanes and alkenes at reaction conditions sufficient to decompose the hydrocarbon gas without reacting all of the boron, resulting in boron particles which are coated with a ceramic layer of boron carbide and are resistant to oxidation and agglomeration.

4,877,650

METHOD FOR FORMING DEPOSITED FILM

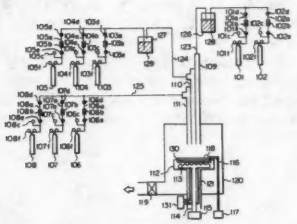
Jinsho Matsuyama, Nagahama; Yutaka Hirai, Hikone; Masao Ueki, Urayasu, and Akira Sakai, Nagahama, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Mar. 30, 1987, Ser. No. 31,133
Claims priority, application Japan, Mar. 31, 1986, 61-73091; Mar. 31, 1986, 61-73094
The portion of the term of this patent subsequent to Oct. 10, 2006, has been disclaimed.
Int. Cl.[4] C23C *16/00*
U.S. Cl. 427—248.1 33 Claims

1. A method for forming a deposited film using starting materials (A) and (B) comprising:

introducing one of the starting materials into a film forming space having a substrate therein;

allowing said one starting material to adsorb onto said surface of said substrate to thereby form an adsorption layer; and



introducing the other starting material into said film forming space, to thereby cause a surface reaction on said adsorption layer to form a deposited film; said starting material (A) being a gaseous starting material for forming a deposited film; and starting material (B) being a gaseous halogenic oxidizing agent capable of having an oxidative action on said starting material (A).

4,877,651

PROCESS FOR THERMALLY DEPOSITING SILICON NITRIDE AND SILICON DIOXIDE FILMS ONTO A SUBSTRATE

Thomas S. Dory, New Haven, Conn., assignor to Olin Corporation, Cheshire, Conn.

Filed May 31, 1988, Ser. No. 200,203
Int. Cl.[4] C23C *16/34, 16/40*
U.S. Cl. 427—255 20 Claims

1. A thermal CVD process for forming silicon nitride film having a refractive index from about 2.0±0.2 or silicon dioxide film having a refractive index from about 1.46±0.2 onto a substrate comprising the steps of:

(a) introducing di-tert-butylsilane and at least one other reactant gas capable of reacting with said di-tert-butylsilane to form silicon nitride or silicon dioxide into a CVD reaction zone containing said substrate on which either a silicon nitride or silicon dioxide-type film is to be formed;

(b) maintaining the temperature of said zone and said substrate from about 450° C. to about 900° C.;

(c) maintaining the pressure in said zone from about 0.1 to about 10 Torr; and

(d) passing said gases into contact with said substrate for a period of time sufficient to form a silicon nitride film having a refractive index from about 2.0±0.2 or silicon dioxide film having a refractive index from about 1.46±0.2 thereon.

4,877,652

WASHABLE MASK PROCESS

Robert D. Sparling, II, Newmarket, and Gerard L. Vachon, Somersworth, both of N.H., assignors to Davidson Textron Inc., Dover, N.H.

Filed Jan. 21, 1988, Ser. No. 146,316
Int. Cl.[4] B05D *3/02, 3/12, 5/00, 1/02*
U.S. Cl. 427—264 6 Claims

1. In a masking process for selectively painting a surface of a part with first and second color paint to form a precise paint line between the two colors of paint, the improvement comprising:

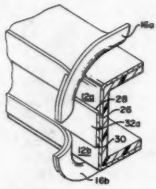
applying a first color paint coating to the surface of the part in preparation for masking, mask trimming and subsequent painting;

masking the surface of the part with a layer of settable and

adherent washable masking material so as to cover the first color paint coating, said material being cuttable when set to form a non-wicking edge;

setting the washable masking material on the first color paint coating to form an adherent layer of masking which covers the first color paint coating so as to be retained thereon during washing and which can be readily and cleanly removed from the first color paint coating following washing;

cutting a first predetermined portion of the set washable masking material to define a paint line and peeling the first predetermined portion of the set washable masking material from the first color paint coating to form an exposed



surface thereon while retaining a second predetermined portion of the set washable masking material on the first color paint coating, the second predetermined portion having a non-wicking edge corresponding to the paint line;

washing and drying the masked and exposed portions of the part surface and thereafter applying a second colored paint coating on the washed surfaces of the part at the non-wicking edge; and

thereafter cleanly peeling the second predetermined portion of the set washable masking material from the part surface to define a precision paint line between the first and second color paint coatings on the part.

4,877,653

PROCESS FOR INSOLUBLIZING SOLVENT SOLUBLE POLYIMIDE COMPOSITIONS

Rohitkumar H. Vora; Dinesh N. Khanna, both of West Warwick, and Suzanne Fontaine, Warwick, all of R.I., assignors to Hoechst Celanese Corporation, Somerville, N.J.

Filed Jul. 12, 1988, Ser. No. 217,796
Int. Cl.[4] B05D *3/02*
U.S. Cl. 427—385.5 **10 Claims**

1. A process for insolubilizing a composition comprising a solvent soluble polyimide comprising:

(a) forming said composition into a shaped article;

(b) subjecting said composition to a heat annealing process at a temperature of at least about 325° C., and for a period of time sufficient to insolubilize said polyimide composition;

said soluble polyimide being the condensation and imidization product of an aromatic diamine and an aromatic dianhydride, wherein at least one of said dianhydride or said diamine is selected from the group consisting of 2,2-hexafluoro-bis-(3,4-dicarboxyphenyl) propane dianhydride; 2,2-hexafluoro-bis (3-aminophenyl)propane; 2,2-hexafluoro-bis(4-aminophenyl) propane; 2,2-hexafluoro-bis[4-(3-aminophenoxy) phenyl]propane; 2,2-hexafluoro-bis[4-(4-aminophenoxy) phenyl]propane; 1,1-bis(4-aminophenyl)-1-phenyl-2, 2,2-trifluoroethane; 1,1-bis-[4-(1,2-dicarboxyphenyl)]-1-phenyl-2,2,2-trifluoroethane dianhydride; and mixtures thereof.

5. The process of claim 1 wherein said shaped article is prepared by forming a solution of said solvent soluble polyimide in organic solvent, applying said solution to a substrate, and evaporating off said organic solvent.

4,877,654

BUFFERED SILANE EMULSIONS FOR RENDERING POROUS SUBSTRATES WATER REPELLENT

Michael E. Wilson, Gainesville, Fla., assignor to PCR, Inc., Gainesville, Fla.

Filed May 2, 1988, Ser. No. 189,146
Int. Cl.[4] B05D *3/02*
U.S. Cl. 427—387 **45 Claims**

20. A process for increasing the resistance to penetration by aqueous media of a porous substrate, said process comprising:

(i) applying to the surface of said substrate a buffered aqueous silane emulsion composition comprising effective amounts of

(a) a hydrolyzable silane essentially hydrolytically stable within a determinable pH range;

(b) an emulsifier or mixture of emulsifiers having an HLB value of from about 1.5 to about 20;

(c) at least one compound for buffering the pH of said composition within said determinable pH stable range; and

(d) water; and

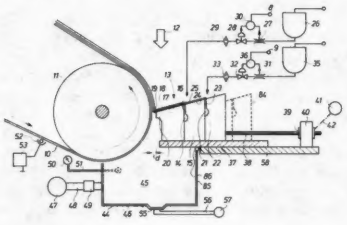
(ii) allowing said composition to cure.

4,877,655

BALL HOLDING AND CEMENTING APPARATUS AND METHOD

John L. Rockerath, Whitesboro, N.Y., and Dale K. Blust, Atco, N.J., assignors to Figgie International Inc., Willoughby, Ohio

Filed Jul. 15, 1987, Ser. No. 73,819
Int. Cl.[4] B05D *1/18*
U.S. Cl. 427—430.1 **23 Claims**



1. A method for holding objects having a cross sectional area of a plane cut through the object and a perifery around the cross sectional area, the method comprising:

(a) supporting a base member,

(b) structurally attaching a plurality of at least three tines projecting from the base member with the center line of each of the tines spaced apart on the periphery of an area identical to that of the perifery of the cross sectional area of the object, and

(c) wedging the object into the area between the tines so that the sides of the tines firmly hold the object, when the base member is held with the points of the tines pointed downwardly.

4,877,656

METHOD OF FABRICATING SIMULATED STONE SURFACES AND IMPROVED SIMULATED STONE PRODUCT

David Baskin, Duxbury, Mass., assignor to Academy of Applied Science, Inc., Concord, N.H., a part interest

Continuation of Ser. No. 928,270, Nov. 6, 1986, abandoned. This application Aug. 18, 1988, Ser. No. 235,702

Int. Cl.[4] B44F *9/04*

U.S. Cl. 428—15 9 Claims

9. An artificial stone-like facing attached to one or more of the topside, edges and areas of the underside of a substrate, and comprising a layer(s) of cured mixture of initially uncured wet and soft synthetic resin binder, color pigment, filler particles and curing agent, said resin being selected from the group consisting of polymerizable unsaturated polyester resins, with and without styrene monomers, epoxy resins and urethane resins; said color pigments being selected from the group consisting of inert inorganic powders and pastes and polyester-dispersed pigments; and said filler particles being selected from the group consisting of powdered silica, silicates, quartz earths and clays and aluminum trihydrate; said layer(s) of cured mixture having been pressure-applied when wet and uncured and compressed against a predetermined smooth surface of high gloss to conform to and the smooth finish of said surface and then cured without heat against and throughout said surface and released therefrom.

4,877,657

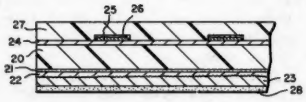
DECORATIVE TRIM STRIP WITH ENHANCED DEPTH OF VISION

Perry N. Yaver, Brighton, Mich., assignor to The D.L. Auld Company, Columbus, Ohio

Filed Feb. 6, 1989, Ser. No. 306,049

Int. Cl.[4] B60R *13/04;* G02B *5/08*

U.S. Cl. 428—31 15 Claims



1. A flexible trim strip especially useful for application to the exterior or interior of an automobile to provide a decorative surface with an enhanced depth of vision, said flexible trim strip comprising a layered composite of:

(a) an elongated transparent or translucent core of a plastic material having a substantially flat top surface and a substantially flat bottom surface;

(b) an opaque layer covering the bottom surface of the transparent core;

(c) an adhesive layer covering the opaque layer, said adhesive layer capable of adhering to the exterior of an automobile for a prolonged time;

(d) a thin metal layer having a mirror-like appearance covering the top surface of the transparent or translucent core, said metal layer when selected portions are removed providing a surface with both a miror-like and patterned appearance; and

(e) a transparent plastic overlay covering the thin metal layer, said overlay characterized in having radiused edges so as to give enhanced depth of vision to the trim strip by creating a lens effect and providing a three dimensional appearance thereto.

4,877,658

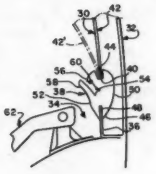
WINDOW LINER FOR USE IN AIRCRAFT

Gale R. Calhoon, 4304 Stearns St., Long Beach, Calif. 90815

Filed Feb. 22, 1988, Ser. No. 158,536

Int. Cl.[4] E06B *3/64*

U.S. Cl. 428—34 12 Claims



1. A liner for an existing window permanently mounted in an existing frame in an aircraft comprising: a stiff sheet of transparent acrylic plastic from about one sixteenth to about one eighth of an inch in thickness having a perimeter firmly set and configured to conform to the shape of said existing window, and a resilient molding engaging said perimeter of said acrylic sheet and formed with an interiorally directed groove adapted to receive and seize said perimeter of said plastic sheet and having an exteriorally directed peripheral surface shaped to conform to the surface of said existing frame of said existing window inwardly of said existing window, whereby said acrylic plastic sheet is held in spaced separation from said existing window.

4,877,659

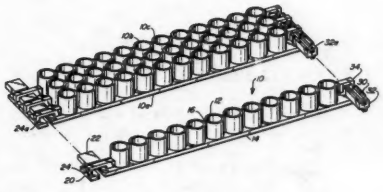
MULTIWELL ASSAY/CULTURE STRIP

Paul W. Vince, San Rafael, Calif., assignor to Inti Corporation, San Rafael, Calif.

Filed Aug. 2, 1988, Ser. No. 227,508

Int. Cl.[4] C12M *1/32*

U.S. Cl. 428—34.1 4 Claims



1. A multiwell assay/culture strip comprising:

a strip member having a base portion and a first and second end;

a plurality of well portions supported on said base portion in linear, side-by-side arrangement;

first male linking means located on said first end and extending some distance therefrom;

first female receiver means located on said first end, said first female receiving means conditioned for releasable engagement with an identical first male linking means of another strip member;

second male linking means located on said second end and extending some distance therefrom; and

second female receiver means located on said second end, said second female receiving means conditioned for releasable engagement with an identical second male linking means of another strip member;

wherein said first male linking means are not engageable with said second female receiving means, and said second male linking means are not engageable with said first female receiving means.

4,877,660

RECOVERABLE FABRIC SLEEVE

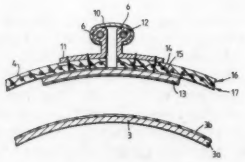
Noel M. M. Overbergh, Bertem, and Jan L. M. F. G. Vansant, Korbeek-Lo, both of Belgium, assignors to Raychem Corporation, Menlo Park, Calif.

Filed Feb. 4, 1988, Ser. No. 152,123

Claims priority, application United Kingdom, Feb. 9, 1987, 8702833

Int. Cl.[4] H02G *15/18*

U.S. Cl. 428—34.9 24 Claims



1. A heat-recoverable tubular or wrap-around sleeve having a recovery ratio of at least 40% and being suitable for enclosing a junction between elongate substrates, which comprises:

(a) a polymeric matrix material; and

(b) a recoverable woven fabric by virtue of which the sleeve is recoverable and which is rendered impervious by the matrix material, comprising 10–35 heat recoverable weft fibres per cm. extending around the circumference of the sleeve in bundles of 2–6, and 2–6 non recoverable warp fibres per cm. extending along the length of the sleeve.

4,877,661

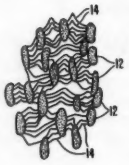
RAPIDLY RECOVERABLE PTFE AND PROCESS THEREFORE

Wayne D. House, Flagstaff, and David J. Myers, Camp Verde, both of Ariz., assignors to W. L. Gore & Associates, Inc., Newark, Del.

Filed Oct. 19, 1987, Ser. No. 110,145

Int. Cl.[4] F16L *9/16;* B32B *27/32;* B29D *7/24*

U.S. Cl. 428—34.9 53 Claims



1. A porous shaped article consisting essentially of PTFE, said article having a microstructure of nodes interconnected by fibrils, said article at ambient temperature capable of being stretched and then rapidly recovering more than about 6% of its stretched length.

4,877,662

VESSEL COMPRISING RESIN COMPOSITION

Jinichi Yazaki, Tokyo, and Akihiko Tamura, Chigasaki, Japan, assignors to Toyo Seikan Kaisha, LTD., Tokyo, Japan

Filed Sep. 22, 1986, Ser. No. 909,726

Claims priority, application Japan, Sep. 20, 1985, 60-206602; Sep. 20, 1985, 60-206603

Int. Cl.[4] B32B *27/08*

U.S. Cl. 428—36.7 6 Claims

1. A vessel which has a multi-layer structure comprising (a) an inner surface layer composed of a propylene resin, (b) a first adhesive layer, (c) an intermediate layer composed of an ethylene/vinyl alcohol copolymer having a vinyl alcohol content of 30 to 80 mole%, (d) a second adhesive layer, (e) an outer surface layer composed of a propylene resin and (f) a layer composed of a blend resin composition interposed between the inner surface layer and the first adhesive layer and/or between the outer surface layer and the second adhesive layer, wherein said blend resin composition contains a scrap resin produced at the vessel-forming step and comprises (i) an ethylene/vinyl alcohol copolymer, (ii) a resin selected from the group consisting of a propylene resin and a polar group-containing thermoplastic resin having in the main chain or side chain a carboxyl group derived from a compound selected from the group consisting of carboxylic acids, carboxylic acid salts, carboxylic anhydrides, carboxylic acid amides, carboxylic acid esters and carbonic acid esters, (iii) a combined stabilizer comprising an alkaline earth metal hydroxide or oxide and an alkaline earth metal salt of a higher fatty acid at a weight ratio of from 1/10 to 10/1, and (iv) an antioxidant composed of a sterically hindered phenol, the amounts of the ethylene/vinyl alcohol copolymer (i), the resin (ii), the combined stabilizer (iii) and the antioxidant (iv) being 1 to 90% by weight, 5 to 98% by weight, 0.01 to 3% by weight and 0.01 to 3% by weight, respectively, based on the sum of the components (i), (ii), (iii) and (iv).

4,877,663

ETHYLENIC THERMOPLASTIC RESIN COMPOSITION

Shigemitsu Kambe, Kawasaki, and Hideaki Miyafuzi, Kisarazu, both of Japan, assignors to Nippon Petrochemicals Company, Limited, Tokyo, Japan

Filed Sep. 6, 1988, Ser. No. 241,084

Claims priority, application Japan, Sep. 11, 1987, 62-226462

Int. Cl.[4] C08J *5/18;* C08L *23/08, 23/18, 33/04;* 525 *221, 222, 227;* 428 *35*

U.S. Cl. 428—35.5 5 Claims

1. A single-layer film formed from an uncrosslinked ethylenic thermoplastic resin composition comprising:

(a) 20–80% by weight of an ethylene/α-olefin copolymer having a density of 0.910 to 0.940 g/cm^3.

(b) 70–5% by weight of a copolymer of ethylene and a carboxyl group containing monomer or a derivative thereof; and

(c) 50–5% by weight of an ethylene/α-olefin copolymer having

(i) a density in the range of not lower than 0.860 g/cm^3 to lower than 0.910 g/cm^3,

(ii) a maximum peak temperature not lower than 100° C. as measured according to differential scanning calorimetry (DSC) and

(iii) a boiling n-hexane insolubles content not smaller than 10% by weight,

provided the total amount of the components (a), (b) and (c) is 100% by weight.

4,877,664

MATERIALS HAVING A DEOXIDATION FUNCTION AND A METHOD OF REMOVING OXYGEN IN SEALED CONTAINERS

Shigeyoshi Maeda; Tsunetoshi Asai, both of Kawasaki; Hidejiro Asano, Sagamihara, and Haruyoshi Taguchi, Osaka, all of Japan, assignors to Nippon Steel Corporation, Tokyo; Suntory Limited, Osaka and Kansai Paint Company, Ltd., Hyogo, all of, Japan

Continuation-in-part of Ser. No. 927,709, Nov. 7, 1986, Pat. No. 4,740,402. This application Apr. 21, 1988, Ser. No. 184,613

Claims priority, application Japan, Nov. 8, 1985, 60-248722; Nov. 9, 1985, 60-251502

The portion of the term of this patent subsequent to Apr. 26, 2005, has been disclaimed.

Int. Cl.[4] B65D *1/00*; B32B *15/04, 27/08*

U.S. Cl. 428—35.9 11 Claims

1. A sealed container having a deoxidation function having at least part of said container being composed of the material having a deoxidation function comprising

(a) a metallic base material reactive with oxygen,

(b) a hydrophilic coating layer formed on the surface of said metallic base material, and

(c) an oxygen- and moisture-permeable coating layer formed on said hydrophilic coating layer, said oxygen- and moisture-permeable coating layer being a film of polymethylpentene.

4,877,665

LINING MATERIAL FOR PIPE LINES

Kumao Higuchi, Chiba; Akio Morinaga, Fujisawa; Masahiro Seshimo, Nishinomiya, and Hitoshi Saito, Moriguchi, all of Japan, assignors to Tokyo Gas Kabushiki Kaisha, Tokyo and Ashimori Tokyo Kabushiki Kaisha, Osaka, both of, Japan

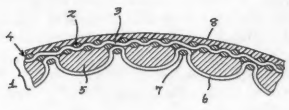
PCT No. PCT/JP87/00839, § 371 Date Jul. 1, 1988, § 102(e) Date Jul. 1, 1988, PCT Pub. No. WO88/03476, PCT Pub. Date May 19, 1988

PCT Filed Oct. 30, 1987, Ser. No. 233,658

Claims priority, application Japan, Nov. 4, 1986, 61-262496

Int. Cl.[4] F16L *55/16, 55/18*

U.S. Cl. 428—36.1 12 Claims



1. A tubular lining material for pipelines utilizable in a pipe-lining method wherein the tubular lining material is bonded onto the inner surface of a pipeline, which material comprises:

(a) a tubular textile jacket having an inner and outer surface, said tubular textile jacket comprising a plurality of interwoven yarns;

(b) a plurality of bulky yarns interwoven with said plurality of yarns along either one of the inner or outer surface of the tubular textile jacket, said plurality of bulky yarns being proportionably larger in size than said plurality of yarns, and

(c) an air-impervious layer bonded to the other surface of the tubular textile jacket than said plurality of bulky yarns.

4,877,666

MAGNETO-OPTIC SUBSTRATES

Boris J. Muchnik, Boulder, Colo., and Bernd F. Fischer, Wiesbaden, Fed. Rep. of Germany, assignors to Kerdix, Inc., Boulder, Colo.

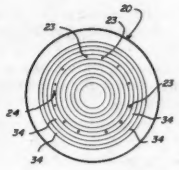
Filed Aug. 11, 1987, Ser. No. 84,273

Int. Cl.[4] G02F *1/09*

U.S. Cl. 428—64 4 Claims

1. A substrate for supporting a magneto-optic recording layer and for transmitting optical energy to said layer for magneto-optic recording, said substrate comprising:

a disk formed from polycarbonate material, said disk defining a primary plane having an axis of symmetry perpendicular thereto, said disk being characterized by having relatively uniform azimuthal birefringence characteristics and having recording locations around circular azimuthal paths which do not exhibit birefringence variations with respect to azimuthal position around said paths, said substrate being manufactured according to the following steps:



providing a mold having a cavity designed to form said substrate as a thin disk that defines said plane and that has said axis of symmetry perpendicular thereto;

mounting such mold horizontally with said axis of symmetry thereof substantially vertical; and

flowing hot, fluid plastic material from said axis of said horizontal mold so that said fluid plastic flows from the center of said mold relatively uniformly and radially outwardly to minimize said azimuthal variations in birefringence of the resulting subtrate.

4,877,667

OPTICAL DISC WITH INHIBITED THERMAL DISTORTION

Michinobu Hattori; Hidemitsu Fujisawa, and Akio Kusaura, all of Amagaski, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

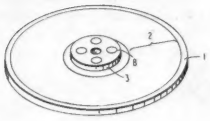
PCT No. PCT/JP87/00343, § 371 Date Mar. 4, 1988, § 102(e) Date Mar. 4, 1988, PCT Pub. No. WO88/00755, PCT Pub. Date Jan. 28, 1988

PCT Filed May 28, 1987, Ser. No. 168,125

Claims priority, application Japan, Jul. 22, 1986, 61-113992; Jul. 22, 1986, 61-113993; Jul. 22, 1986, 61-113994; Jul. 22, 1986, 61-113995

Int. Cl.[4] B32B *3/02*

U.S. Cl. 428—64 3 Claims



1. An optical disc assembly, comprising:

(a) a centrally apertured, planar disc substrate (1) made of a plastic material, such as polycarbonate, having a high coefficient of thermal expansion,

(b) an annular optical information recording/reproducing layer (2) formed on the substrate concentrically surrounding the central aperture thereof and having an inner periphery spaced radially outwardly therefrom,

(c) a pair of turntable mounting and centering discs (3) individually coaxially disposed on opposite sides of the substrate, said discs having axially aligned central spindle

apertures of smaller diameter than the substrate aperture and being made of a magnetic material having a coefficient of thermal expansion lower than that of the substrate, and

(d) means for fixedly mounting the so disposed discs to the substrate, said mounting means having a coefficient of thermal expansion substantially the same as that of the substrate such that thermal expansions and contractions of the substrate are borne by the mounting means to attendantly avoid any planar distortion or buckling of the substrate,

(e) wherein said mounting means is selected from the group comprising:

(1) a pair of intermediate discs (7) configured substantially identical to the mounting and centering discs, made of the same plastic material as the substrate, individually coaxially disposed between the respective mounting and centering discs and the substrate, and adhesively bonded thereto, and

(2) a plurality of headed anchoring studs (9) individually extending through an equal plurality of axially parallel apertures (8) spaced around the spindle aperture of each disc and extending therethrough, said anchoring studs having inner ends ultrasonically welded to the substrate.

4,877,668

PRESSURE VESSEL SIGHT GLASSES

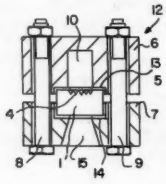
Paul Hinz, Mainz-Finthen; Helmut Dislich, Budenheim, and Gerhard Weber, Schornsheim, all of Fed. Rep. of Germany, assignors to Schott Glaswerke, Mainz, Fed. Rep. of Germany

Filed Jan. 20, 1987, Ser. No. 4,404

Claims priority, application Fed. Rep. of Germany, Jan. 20, 1986, 3601500

Int. Cl.[4] B32B *1/04, 3/02*

U.S. Cl. 428—68 **10 Claims**



1. A pressure vessel sight glass suitable for pressure vessels containing boiler feed water at a temperature up to about 300° C., said sight glass being mounted between a base plate and a counter plate, for insertion into or attachment to said pressure vessel, said sight glass having a thickness of 7–30 mm and being protected against the corrosive action of boiler feed water by a transparent coating of stannic oxide additionally containing chromic oxide.

4,877,669

TUFTED PILE FABRIC

Frank Endrenyi, Jr., Chattanooga, Tenn., and Larry W. Hankins, Dalton, Ga., assignors to Collins & Aikman Corporation, New York, N.Y.

Filed Jan. 12, 1989, Ser. No. 296,490

Int. Cl.[4] B32B *3/02, 33/00*

U.S. Cl. 428—88 **9 Claims**

1. A tufted pile fabric characterized by having diagonal lines of tufts of different colors across the face of the fabric, said fabric comprising a primary backing, first and second sets of pile yarns formed of continuous filaments and forming pile tufts connected to and extending upwardly from the primary backing and forming a pile face across the primary backing, said first set of pile yarns being of a first characteristic, said second set of pile yarns being of a second characteristic differing in appearance from said first characteristic, the yarns in said first set being of a substantially solid color throughout their lengths, the yarns in said second set being space dyed yarns having a series of different colored segments of yarn along their length and wherein the different colored segments are randomly arranged throughout the respective yarns, each set of pile yarns forming longitudinally extending zig-zag rows of pile tufts so arranged that the pile tufts formed from the yarns of said first set form first diagonal lines of pile tufts extending diagonally across the pile face of the fabric from one

side of the fabric to the other and the pile tufts formed from the yarns of said second set form second diagonal lines of pile tufts alternating with said first diagonal lines of pile tufts across the pile face of the fabric and wherein the face of the fabric presents the overall appearance of cut pile fabric and wherein only some of the pile tufts are cut pile tufts and are randomly arranged throughout the fabric, and wherein the remaining pile tufts include randomly arranged uncut loop pile tufts and randomly arranged partially cut loop pile tufts with only some of the continuous filaments forming the loop pile being cut at the face of the fabric.

4,877,670

CORDIERITE HONEYCOMB STRUCTURAL BODY AND METHOD OF PRODUCING THE SAME

Toshiyuki Hamanaka, Suzuka, Japan, assignor to NGK Insulators, Ltd., Nagoya, Japan

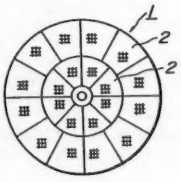
Filed Dec. 29, 1986, Ser. No. 946,901

Claims priority, application Japan, Dec. 27, 1985, 60-293691; Aug. 5, 1986, 61-182824

The portion of the term of this patent subsequent to Sep. 20, 2005, has been disclaimed.

Int. Cl.[4] B32B *3/12*

U.S. Cl. 428—116 **9 Claims**



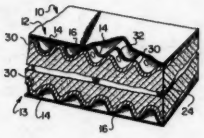
1. A cordierite honeycomb structural body comprising crystalline phases consisting essentially of cordierite, a total pore volume of a pore diameter of not less than 5 μm of not more than 0.04 cc/g, a coefficient of thermal expansion of not more than 1.0×10^{-6}/°C. in the temperature range of 40°–800° C., and a chemical composition by weight of 42–56% of SiO_2, 30–45% of Al_2O_3 and 12–16% of MgO.

4,877,671

REDUCING SHRINKAGE OF PHENOLIC FOAM COMPOSITES

Malcolm J. Stagg, Beaconsfield; Eric P. Stern, Montreal, and Sunil Vidyarthi, Beaconsfield, all of Canada, assignors to BPCO, Inc., Canada

Filed Mar. 9, 1988, Ser. No. 165,747
Claims priority, application Canada, Mar. 13, 1987, 532,006
Int. Cl.[4] B32B *3/10*
U.S. Cl. 428—139 37 Claims



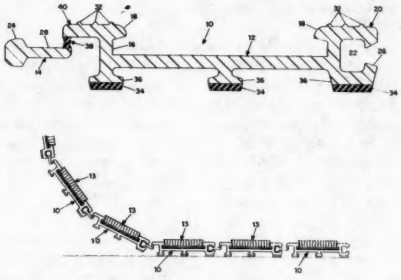
1. A foam composite comprising first and second oppositely disposed corrugates skins and a core of cured foam material between said skins, and a reinforcement medium located at the interface between said foam core and each said skin, said foam extending through interstices or pores in said medium and bonding to said medium and each said skin.

4,877,672

FLOOR MAT WITH RIGID RAILS JOINED BY LIVING HINGES

Thomas A. Shreiner, Muncy, Pa., assignor to Construction Specialties, Inc., Cranford, N.J.

Filed Oct. 11, 1988, Ser. No. 255,733
Int. Cl.[4] B32B *3/10*; E04C *1/30*
U.S. Cl. 428—156 2 Claims



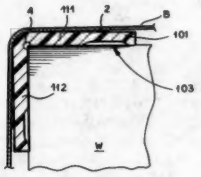
1. In a floor mat composed of a multiplicity of rigid elongated rails arranged parallel to each other, each rail having a body portion adapted to receive a tread member and a coupling portion by which it is joined to an adjacent rail, the body and coupling portions being a monolithic formation produced by extrusion from a thermoplastic polymeric material, the improvement wherein the body portion and the coupling portion of each rail are formed by extrusion of a rigid high-impact strength thermoplastic polymeric material and wherein the body portion and coupling portion of each rail are joined by a living hinge in the form of a longitudinally continuous thin strand of a highly flexible thermoplastic elastomer coextruded with the body portion and coupling portion and forming a distinct bending line for articulation of the body portion relative to the coupling portion.

4,877,673

EDGE PROTECTOR

Hans-Joachim Eckel, Wesel, and Hans Warych, Gelsenkirchen, both of Fed. Rep. of Germany, assignors to Signode System GmbH, Dinslaken, Fed. Rep. of Germa y

Filed Jun. 13, 1988, Ser. No. 206,235
Claims priority, application Fed. Rep. of Germany, Jun. 13, 1987, 3719847
Int. Cl.[4] B32B *3/06*
U.S. Cl. 428—172 4 Claims



1. An edge protector adapted to be interposed between a strap and an article having an edge to be protected, said edge protector comprising:

an elongated body of a generally L-shaped cross section composed at least in part of extruded thermoplastic synthetic resin and having a pair of flanges angularly adjoining at a junction and formed with respective longitudinal edges, said body having inner and outer surfaces; and

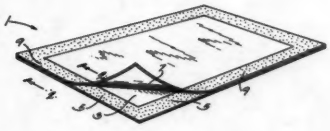
a pressure-adhering adhesive strip on one of said surfaces between said longitudinal edges and extending generally along a longitudinal dimension of said body, said body being formed in the other of said surfaces with a longitudinally extending recess located with respect to said strip such that, upon stacking of the edge protector with other identical, edge protector a said adhesive strip of one of the stacked edge protectors will lie in a said recess of another of the stacked edge protectors without contact with the respective body thereof, the recess being formed in the inner surface of the respective body and the respective adhesive strip being provided on the outer surface of the respective body.

4,877,674

DIRECT OVERWRAP FOR BAR SOAP

Kenneth C. Kappes, Hartland, Wis., assignor to Milprint, Inc., Milwaukee, Wis.

Filed May 13, 1987, Ser. No. 49,204
Int. Cl.[4] B32B *23/02*; B65D *81/26*
U.S. Cl. 428—192 6 Claims



1. A laminate comprising:

a. a first rectangular sheet of thin flexible plastic material having a size and shape for wrapping around a selected object and having four marginal edges;

b. a first band of adhesive deposited along the margins of the first sheet;

c. a second sheet of thin flexible moisture absorbent material having four edges coterminous with the edges of said first sheet and superimposed on the first sheet and bonded thereto along a band line adjacent the margins thereof by

means of the adhesive to form a nonadhered zone within the peripheral band line; and

d. a second band of adhesive in the form of cold seal cohesive deposited around the margins of the exposed side of the second sheet above said first band,

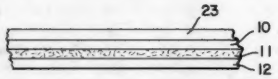
so that the laminate may be wrapped around a selected object and said second adhesive bands seal the edges of the object to thereby create a double layer of wrapping around the object so that wrinkling of said second sheet does not cause a corresponding wrinkling of said first sheet within said non-adhered zone with a layer of air between the two sheets.

4,877,675

LIGHT TRANSMITTING OR REFLECTIVE SHEET RESPONSIVE TO TEMPERATURE VARIATIONS

Waqidi Falicoff, 585 Orchard St., Ashland, Oreg. 97520; Richard Delano, Box 96 Old Field Rd., Setauket, N.Y. 11733, and Chad J. Raseman, 644 West San Francisco, Santa Fe, N. Mex. 87501

Filed Sep. 29, 1988, Ser. No. 250,868
Int. Cl.[4] B32B *3/00*
U.S. Cl. 428—204 15 Claims



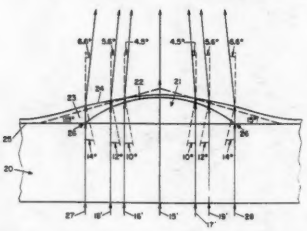
7. A structure as in claim 1 wherein the gel is thick and viscous and has a viscosity in the range of 1000 to 100,000 CPS.

4,877,676

HOT MELT INK TRANSPARENCY

Linda T. Creagh, West Lebanon; Steven F. Fulton, Hanover, both of N.H.; Paul A. Hoisington, Norwich, Vt.; Bruce A. Paulson, Lebanon; Robert R. Schaffer, Canaan, both of N.H., and Charles W. Spehrley, Jr., Hartford, Vt., assignors to Spectra, Inc., Hanover, N.H.

Division of Ser. No. 50,285, May 14, 1987, Pat. No. 4,801,473.
This application Sep. 20, 1988, Ser. No. 246,696
Int. Cl.[4] B32B *7/04, 3/00*
U.S. Cl. 428—204 9 Claims



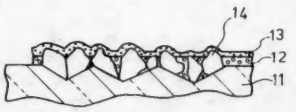
1. A transparency comprising a transparent substrate, a translucent or transparent ink pattern on the substrate in the form of three-dimensional ink spots having curved surfaces, and a transparent layer on the substrate and the ink spots made of a material which wets the substrate and the ink spots and has approximately the same index of refraction as that of the ink spots.

4,877,677

WEAR-PROTECTED DEVICE

Kumiko Hirochi, Moriguchi; Makoto Kitabatake, Katano, and Osamu Yamazaki, Toyonaka, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Kadoma, Japan

Filed Feb. 18, 1986, Ser. No. 830,085
Claims priority, application Japan, Feb. 19, 1985, 60-30907; Apr. 18, 1985, 60-82850; Jul. 4, 1985, 60-147943; Sep. 12, 1985, 60-200475
Int. Cl.[4] B32B *9/00;* G11B *5/72*
U.S. Cl. 428—216 19 Claims



1. A wear-protected device comprising:

a substrate to be protected from a physical action thereto, said substrate being made of a material selected from the group consisting of glass, metal, plastic film and resin,

a hard carbon film formed on said substrate by ion irradiation, said hard carbon film consisting essentially of carbon or carbon and hydrogen, and

a lubricative film, which has a friction coefficient which is less than 0.3 and smaller than that of said hard carbon film, formed on said hard carbon film.

4,877,678

SHEET MATERIAL FOR INK-JET PRINTING

Masamitsu Hasegawa; Satoshi Tamura; Takashi Wakashima, and Isao Sugiyama, all of Saitama, Japan, assignors to Shin-Etsu Polymer Co., Ltd., Tokyo, Japan

Filed May 25, 1988, Ser. No. 198,398
Claims priority, application Japan, Jun. 5, 1987, 62-140897
Int. Cl.[4] B41M *5/00*
U.S. Cl. 428—216 7 Claims

1. A sheet metal for ink-jet printing which comprises three successive layers including:

(a) a base sheet;

(b) a first coating layer on the surface of the base sheet having a thickness in the range from 5 to 30 μm formed by coating the surface of the base sheet with a first coating liquid which is a uniform dispersion of a powder of a highly water-absorptive resin capable of absorbing water in an amount of 10 to 2000 times by weight based on the dry weight thereof in a first organic polymer as a binder, the powder of the highly water-absorptive resin having an average particle diameter in the range from 0.1 to 30 μm, and

(c) a second coating layer on the first coating layer having a thickness in the range from 5 to 50 μm formed by coating the first coating layer with a second coating liquid which is a uniform dispersion of a powdery water-absorptive inorganic filler having an average particle diameter in the range from 0.01 to 50 μm and a water absorption of at least 2 x by weight of the dry weight of the powder in a second organic polymer as a binder.

4,877,679

MULTILAYER ARTICLE OF MICROPOROUS AND POROUS MATERIALS

Dennis D. Leatherman, Pittsburgh, Pa.; Thomas Rechlicz, Clinton, and Richard A. Schwarz, Akron, both of Ohio, assignors to PPG Industries, Inc., Pittsburgh, Pa.

Filed Dec. 19, 1988, Ser. No. 286,585
Int. Cl.[4] B32B *3/00, 5/22*
U.S. Cl. 428—224 35 Claims

1. A multilayer article comprising at least one layer of po-

rous material bonded to at least one layer of microporous material comprising

(a) a matrix consisting essentially of essentially linear ultrahigh molecular weight polyolefin which is essentially linear ultrahigh molecular weight polyethylene having an intrinsic viscosity of at least about 18 deciliters/gram, essentially linear ultrahigh molecular weight polypropylene having an intrinsic viscosity of at least about 6 deciliters/gram, or a mixture thereof; said matrix comprising regions of stretch-induced molecularly oriented ultrahigh molecular weight polyolefin distributed throughout said matrix,

(b) finely divided particulate substantially water-insoluble filler, of which at least about 50 percent by weight is siliceous, distributed throughout said matrix, said filler constituting from about 50 percent to about 90 percent by weight of said microporous material, and

(c) a network of interconnecting pores communicating throughout said microporous material, said pores before bonding constituting more than 80 percent by volume of said microporous material.

6. The multilayer article of claim 1 wherein said layer of porous material is a layer of fabric.

4,877,680

RECORDING MEDIUM WITH NON-POROUS INK-RECEIVING LAYER

Mamoru Sakaki, Hiratsuka; Ryuichi Arai, Sagamihara; Takashi Akiya, Yokohama; Shigeo Toganoh; Masahiko Higuma, both of Tokyo; Naonobu Eto, Yamato; Hidemasa Mouri; Michiaki Tobita, both of Yokohama; Masahiko Ishida, Fujisawa, and Shunzo Kono, Yokosuka, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 932,524, Nov. 20, 1986, abandoned.
This application Sep. 20, 1988, Ser. No. 246,948
Claims priority, application Japan, Nov. 26, 1985, 60-263830
Int. Cl.[4] B41M 5/00
U.S. Cl. 428—332 10 Claims

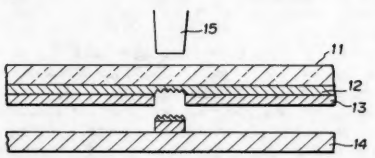
1. A recording medium comprising a substrate and a non-porous ink receiving layer provided thereon, said ink receiving layer comprising a water-insoluble polymer complex and a cationic resin of 2 to 30% by weight based on said polymer complex, said polymer complex being formed from an acidic polymer and a basic polymer.

4,877,681

HEAT-SENSITIVE TRANSFER MATERIAL

Koji Hanada, Ohmiyashi; Masashi Sawamura, Shiraokamati; Takeshi Yoshikawa, Katushikaku; Hiroyuki Nihashi, Yonoshi, and Tsuneo Tanaka, Meguroku, all of Japan, assignors to Toyo Ink Manufacturing Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 170,308, Mar. 14, 1988, abandoned.
This application Mar. 2, 1989, Ser. No. 319,869
Claims priority, application Japan, Mar. 17, 1987, 62-60215
Int. Cl.[4] B41M 5/26
U.S. Cl. 428—336 7 Claims



1. In a heat-sensitive transfer material having a substrate and a heat-melting ink layer on one surface of said substrate, the improvement wherein there is provided, between said substrate and said heat-melting ink layer, an interlayer which breaks away within itself under heat at the time of heat transfer, said interlayer containing at least 4% by weight of a high fatty acid metal salt of the formula

$$(C_nH_{2n+1}COO)_mMe$$

or

$$[C_6H_{13}13\ CH(OH)—(CH_2)_{10}—COO]_mMe$$

wherein n is an integer of from 11 to 31,
m is an integer of from 1 to 3, and
Me is a member selected from the group consisting of lithium, sodium, potassium, magnesium, calcium, barium, zinc and aluminum.

4,877,682

LAMINATES CONTAINING COEXTRUDED SCRAP

Marvin E. Sauers, Belle Mead; Tyler F. Hartsing, Jr., Westfield, both of N.J., and Lee P. McMaster, Fairfield, Conn., assignors to Amoco Corporation, Chicago, Ill.

Continuation of Ser. No. 843,297, Mar. 24, 1986, abandoned.
This application Feb. 24, 1988, Ser. No. 160,458
Int. Cl.[4] B65D 23/00; B32D 27/36
U.S. Cl. 428—412 39 Claims

1. A continuous plastic laminate comprising at least three melt coextruded sheets, each sheet comprising at least one thermoplastic polymer, the outside sheets having a higher stiffness at use temperature than at least one inside sheet, said inside sheet comprising laminate scrap derived from the production of said laminate comprising a blend of a thermoplastic polymer A and thermoplastic polymer B, thermoplastic polymer A having a higher glass transition temperature than thermoplastic polymer B and said outside sheets comprising thermoplastic polymer A, wherein said thermoplastic polymers are selected from the group consisting of one or more of the following: a polyrylethersulfone, a poly(aryl ether), a polyarylate, a polyetherimide, a polyester, an aromatic polycarbonate, a styrene resin, a poly(alkyl acrylate), a polyhydroxyether, a polyamide, a poly(arylene sulfide), a crystalline polyolefin, and a polyphenylene oxide; said laminate comprising the following:

A/ABA/B/A,

A/B/ABA/A,

A/ABA/B/ABA/A,

AABA/B/A,

A/B/AABA,

AABA/B/AABA,

A/ABAB/A,

AABA/ABAB/A,

A/ABAB/AABA, or

AABA/ABAB/AABA.

4,877,683

FLUOROPOLYMER LAMINATES

Chester G. Bragaw, Jr., Kennett Square; Thomas P. Concannon, Newtown Square, both of Pa., and Robert F. Davis, Wilmington, Del., assignors to E. I. Du Pont De Nemours and Company, Wilmington, Del.

Filed May 25, 1988, Ser. No. 198,521
Int. Cl.[4] B32B 27/08, 27/32
U.S. Cl. 428—421 8 Claims

1. A laminate comprising at least two abutting layers of fluoropolymer, at least one of which is polyvinyl fluoride, the laminate being free from adhesive between the adjacent fluoro-

polymer layers, having a film-tearing interfacial bond and substantially no interfacial comingling of the adjacent fluoropolymer layers beyond the molecular level.

4,877,684

NYLON CARRIER FOR POLYMER CONCENTRATE, AND FILMS AND PACKAGES MADE WITH THE CONCENTRATE

Mary E. Shepard, Oshkosh; Deane E. Galloway, and Keith D. Lind, both of Appleton, all of Wis., assignors to American National Can Company, Chicago, Ill.

Filed Aug. 24, 1987, Ser. No. 88,344
Int. Cl.[4] B32B *27/08, 27/34;* C08J *3/20;* C08K *3/00*
U.S. Cl. 428—475.8 20 Claims

1. A multiple layer film having first and second surface layers, said first surface layer consisting essentially of the composition resulting from the combining of (i) 90% to 99.5% by weight of a first nylon polymer composition and (ii) 10% to 0.5% by weight of an additive concentrate, said additive concentrate consisting essentially of 20% to 85% by weight of a second nylon polymer composition and 80% to 15% by weight of additive agent selected from the group of materials capable of functioning as anti-block agents and slip agents, said second surface layer comprising a polymeric composition capable of forming a heat seal when heat is applied to said first surface layer and driven through said film to said second surface layer.

4,877,685

MODIFIED POLYOLEFINE

Christer Bergstrom, and Tor H. Palmgren, both of Helsinki, Finland, assignors to Neste Oy, Finland

Filed May 28, 1987, Ser. No. 55,032
Claims priority, application Finland, May 28, 1986, 862263
Int. Cl.[4] B32B *15/08*
U.S. Cl. 428—500 18 Claims

1. Modified polyolefine having good adhesion to metals and to polar substances, which comprises an ethylene copolymer selected from ethylene/butylacrylate (EBA), ethylene/ethylacrylate (EEA), ethylene/methylacrylate (EMA), and ethylene/vinylacetate (EVA) being admixed with or grafted to fumaric acid, said modified polyolefine having an acid content of less than 1%.

4,877,686

RECORDING SHEET FOR INK-JET PRINTING AND PROCESS FOR ITS PREPARATION

Claude R. Riou, Veyrier Le Lac, and Georges M. Gidon, La Balme de Stillingy, both of France, assignors to Societe Anonyme: Aussedat-Rey, France

Continuation of Ser. No. 51,053, May 15, 1987, abandoned. This application Oct. 4, 1988, Ser. No. 253,413
Claims priority, application France, May 20, 1986, 86 07355
Int. Cl.[4] B41M *5/00*
U.S. Cl. 428—514 6 Claims

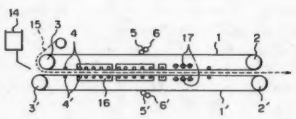
1. A recording sheet for use in connection with inkjet printing comprising an opaque base sheet and a surface coating on said base sheet, said surface coating comprising a polyhydroxylic polymeric binder with the hydroxyl groups in the cis position, a substantial portion of said binder having been gelled with a gelling agent selected from the group consisting of boric acid, derivatives of boric acid, and mixtures thereof, and a filler component having high absorption capacity, said binder being present in an amount of from about 10 to 100 percent by weight of the amount of said filler, whereby said filler primarily acts as the ink receptor in said ink-jet printing and the shape, size and uniformity of dots of said ink as applied to said recording sheet may be substantially improved thereby.

4,877,687

SYNTHETIC RESIN MOLDED ARTICLE HAVING ANTISTATIC PROPERTY

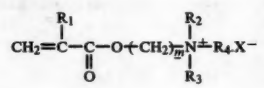
Kiyotaka Azegami, Machida; Suehiro Tayama, Otake; Naoki Yamamoto, Hiroshima; Akira Yanagase, and Hiroki Hatakeyama, both of Otaka, all of Japan, assignors to Mitsubishi Rayon Company, Ltd., Tokyo, Japan

Filed Sep. 14, 1987, Ser. No. 95,671
Claims priority, application Japan, Sep. 16, 1986, 61-217601
Int. Cl.[4] B32B *27/08;* C09K *3/16*
U.S. Cl. 428—520 13 Claims



1. A synthetic resin molded article having good antistatic properties, which comprises a body of a synthetic resin (B) having a surface layer which is predominantly comprised of an antistatic polymer (A) and is integral with the body, said antistatic polymer (A) comprising:

20 to 100% by weight of units derived from a monomer having a quaternary ammonium base, and represented by the following general formula (I):



(I)

wherein

R_1 represents a hydrogen atom or a methyl group,

R_2 through R_4 independently represent a hydrogen atom or an alkyl group having 1 to 9 carbon atoms, which may have a substituent,

m is an integer of from 1 to 10, and

X^- is an anion of a quaternizing agent, and

0 to 80% by weight of units derived from at least one monomer copolymerizable therewith,

wherein said synthetic resin molded article is obtained by forming a film of the antistatic polymer (A) on the molding surface of a casting mold, casting a polymerizable material to be formed into the synthetic resin (B) as the base material in the casting mold, and polymerizing the polymerizable material to form a body of the synthetic resin (B) simultaneously rendering the film of the antistatic polymer (A) integral with the body of the base material.

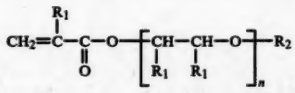
4,877,688

INK-JET RECORDING SHEET

Hideaki Senoo, Tokyo; Takeshi Yamasaki; Yasuo Satoh, both of Funabashi, and Mamoru Sugaya, Kawasaki, all of Japan, assignors to Mitsubishi Paper Mills, Ltd., Tokyo, Japan

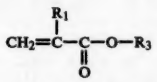
Filed Feb. 19, 1988, Ser. No. 160,749
Claims priority, application Japan, Feb. 24, 1987, 62-40598
Int. Cl.[4] B41M 5/00
U.S. Cl. 428—522 5 Claims

1. An ink jet recording sheet consisting essentially of a transparent support and, provided thereon, at least one ink-receiving layer which is a light transmission layer obtained by coating and drying an emulsion polymerized composition obtained by emulsion polymerization of (a) 100 parts by weight of a compound represented by the formula:



(I)

wherein R_1 represents a hydrogen atom, a methyl group, an ethyl group or a propyl group; R_2 represents a hydrogen atom r an alkyl group of 1–5 carbon atoms; and n represents an integer of 1–20 or (b) 100 parts by weight in total of the compound of the formula (I) and a compound represented by the formula:



(II)

wherein R_1 is as defined above; and R_3 represents an alkyl group of 1–18 carbon atoms, with a proviso that the amount of the compound of the formula (II) is not more than that of the compound of the formula (I); and 30–100 parts by weight of polyvinyl alcohol as an emulsifier.

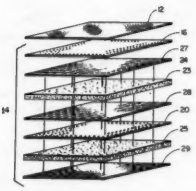
5. A process for ink jet recording wherein an aqueous ink is applied to the ink jet recording sheet of claim 1.

4,877,689

HIGH TEMPERATURE INSULATION BARRIER COMPOSITE

Joseph W. Onstott, Canoga Park, Calif., assignor to United States of America as represented by the Administrator, National Aeronautics and Space Administration, Washington, D.C.

Filed Sep. 30, 1988, Ser. No. 252,078
Int. Cl.[4] B32B 15/04; F16L 59/00
U.S. Cl. 428—607 14 Claims



1. A composite material suitable for use as a high temperature insulation barrier for outer surfaces of spacecraft and other hypervelocity vehicles comprising an outer skin layer of nickel chromium and of nickel chromium foil, a first layer of silicon carbide fabric under said top layer, a first layer of alumina batting under said first layer of silicon carbide, a second layer of silicon carbide fabric under said first layer of alumina, an additional layer of nickel chromium foil under said second layer of silicon carbide, a second layer of alumina batting under said additional layer of nickel chromium foil, and finally a third layer of silicon carbide fabric under said second layer of alumina an interleaved inner region comprised of a top layer

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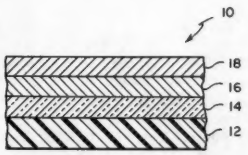
4,877,690

MAGNETOOPTICAL RECORDING ELEMENT

David A. Glocker, W. Henrietta; Tukaram K. Hatwar, Penfield; Gregory Lynn McIntire, West Chester, all of N.Y.; Srinivas T. Rao, Los Gatos, Calif., and Douglas G. Stinson, Fairport, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Mar. 1, 1989, Ser. No. 317,401
Int. Cl.[4] G11B 7/24
U.S. Cl. 428—627 10 Claims



1. A magnetooptical recording element which comprises an assembly of layers including a rare earth, transition metal recording layer having on one surface a ceramic barrier layer and on the other surface a self-passivating active metal layer having a thermal conductivity substantially equivalent to that of the ceramic barrier layer, said assembly of layers being supported on a substrate.

4,877,691

SOIL RELEASE AGENT AND METHOD TO FACILITATE THE CLEANING OF OVENS USED FOR COOKING

John R. Cockrell, Jr., Greensboro, N.C., assignor to Kay Chemical Company, Greensboro, N.C.

Filed Nov. 27, 1985, Ser. No. 802,313
Int. Cl.[4] B32B 19/00; B05D 1/00; B08B 17/00
U.S. Cl. 428—688 54 Claims

1. A composition for the pre-treatment in aqueous form of a surface which is subjected to heat and is liable to soiling by baked-on organic food deposits consisting essentially of:

a. a food-safe, inorganic thickening agent which is substantially insoluble in the aqueous form of said composition and which is present in an amount sufficient so that the aqueous form of said composition is capable of forming a continuous coating adhered to all desired portions of said surface, which coating also remains continuous as the coating dries; and

b. an alkaline, food-safe, water-scluble inorganic salt in an amount sufficient so that said composition is readily removable with water or an aqueous solution after said composition has been dried and soiled.

23. A continuous film adhered to a desired surface which is subjected to heat and is liable to soiling by baked-on organic food deposits, said film having been dried, consisting essentially of:

a. a food-safe, inorganic thickening agent which is an inorganic clay material and which is present in an amount sufficient so that said film is still continuous after said drying; and

b. an alkaline, water-soluble, food-safe inorganic salt present in an amount sufficient so that said film is readily removable with water or an aqueous solution after soiling.

25. A method for cleaning a desired surface which is subjected to heat and is liable to soiling by baked-on organic food deposits comprising the steps of:

a. applying to the surface a composition consisting essentially of:
   i. a food-safe, inorganic thickening agent which is substantially insoluble in said composition and which is present in an amount sufficient so that said composition is capable of forming a continuous coating adhered to all desired portions of the surface, which coating also remains continuous as the coating dries,
   ii. an alkaline, water-soluble, food-safe, inorganic salt in an amount sufficient so that said composition is readily removable with water or an aqueous solution after said composition has been dried and soiled, and
   iii. water,
   to form a continuous coating on the surface;
b. drying the continuous coating to form a film;
c. allowing the film to become soiled; and
d. removing the soiled film by contacting it with water or an aqueous solution.

4,877,692

CLAD SYSTEM FOR BRAZING TO ALUMINA

Howard Mizuhara, Hillsborough, and Eugene Huebel, Union City, both of Calif., assignors to GTE Products Corporation, Stamford, Conn.

Division of Ser. No. 121,205, Nov. 16, 1987, Pat. No. 4,785,989. This application Sep. 12, 1988, Ser. No. 242,651
Int. Cl.[4] B32B *15/04*
U.S. Cl. 428—673 **7 Claims**

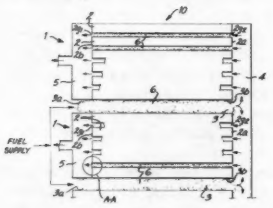
1. The combustion of a clad system for brazing to alumina comprising a relatively thick layer of a cushioning metal clad with a thinner layer of a low blushing metal, and a thin layer of an active brazing filler metal, the active brazing filler metal blushing to a greater extent on the cushioning metal than on the low blushing metal.

4,877,693

FUEL CELL APPARATUS FOR INTERNAL REFORMING

Bernard S. Baker, Brookfield Center, Conn., assignor to Energy Research Corporation, Danbury, Conn.

Continuation of Ser. No. 37,808, Apr. 10, 1987, abandoned, which is a continuation of Ser. No. 812,315, Dec. 23, 1985, abandoned. This application Dec. 2, 1987, Ser. No. 129,928
Int. Cl.[4] H01M *8/18*
U.S. Cl. 429—19 **10 Claims**



1. Apparatus comprising:
a number of one or more first fuel cells arranged in a first stack, the first cells having respective first end faces which are aligned and respective second end faces which are aligned, each first cell including a sandwich construction of an anode chamber, an anode electrode, an electrolyte, a cathode electrode and a cathode chamber, each anode chamber extending between the first and second end faces of its respective first cell and having a gas entry port adjacent the first end face and a gas exit port adjacent the second end face;
a catalyst chamber in heat conducting relationship with the first stack and running in the direction of the anode chambers of said first cells, said catalyst chamber having a gas entry port adjacent the second end faces of said first cells and a gas exit port adjacent the first end faces of said first cells;
a catalyst for endothermic reforming of the hydrocarbon content of a fuel disposed in one of more of said anode chambers and said catalyst chamber, the catalyst in said catalyst chamber being disposed from the gas entry port of said catalyst chamber to a point short of the gas exit port of said catalyst chamber and the catalyst in said one or more anode chambers being partially disposed in each of its respective anode chambers from the gas entry port of the chamber to a point short of the gas exit port;
and first means for coupling the gas exit port of said catalyst chamber to the gas entry ports of the anode chambers of said first cells.

4,877,694

GAS DIFFUSION ELECTRODE

Frank Solomon, Great Neck; Yury Genodman, Brooklyn, both of N.Y., and Jaime Irizarry, Kearny, N.J., assignors to Eltech Systems Corporation, Boca Raton, Fla.

Filed May 18, 1987, Ser. No. 51,551
Int. Cl.[4] H01M *4/86, 12/06*
U.S. Cl. 429—27 **49 Claims**

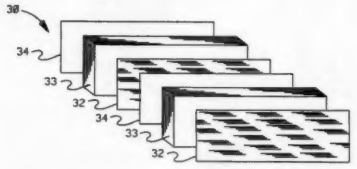
1. An electrode capable of extended performance at high current density, said electrode comprising a gas porous, gas supplying layer containing hydrophobic polymer, and an electrolyte porous active layer comprising catalyst containing carbon particles intimately blended with, and uniformly distributed throughout, hydrophilic halogenated polymer binder for said catalyzed carbon particles, which intimate blend is combined in said active layer with particulate substance bound with hydrophobic polymer.

4,877,695

NON-AQUEOUS ELECTROCHEMICAL CELL

Robert A. Cipriano, Lake Jackson; R. Vernon Snelgrove, Damon, and Francis P. McCullough, Jr., Lake Jackson, all of Tex., assignors to The Dow Chemical Company, Midland, Mich.

Continuation-in-part of Ser. No. 250,789, Sep. 28, 1988, which is a continuation-in-part of Ser. No. 4,003, Jan. 16, 1987, abandoned, which is a continuation-in-part of Ser. No. 3,974, Jan. 16, 1987, abandoned. This application Nov. 1, 1988, Ser. No. 265,652
Int. Cl.[4] H01M *6/20*
U.S. Cl. 429—102 **9 Claims**

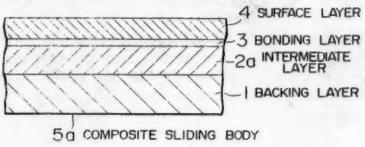


1. A non-aqueous electrochemical cell comprising:
an anode comprising a molten mixture of at least two elements selected from the group consisting of sodium, potassium, cesium and rubidium;
a cathod comprising an electrically conductive carbonaceous material; and,
a non-aqueous electrolyte comprising:
   (1) a solvent, and
   (2) an electrolyte salt selected from the group consisting of an alkali metal tetrafluoroborate and a tetraalkyl ammonium tetrafluoroborate.

4,877,696
COMPOSITE SLIDING STRUCTURE

Takashi Muto, Nagoya, Japan, assignor to Daido Metal Company, Nagoya, Japan

Filed Nov. 24, 1987, Ser. No. 129,388
Claims priority, application Japan, Dec. 15, 1986, 61-296627
Int. Cl.[4] B32B *15/20*
U.S. Cl. 428—645 **2 Claims**



1. A composite sliding structure composed of a surface layer, a bond layer bonded to the surface layer, an intermediate layer bonded to the bond layer and a backing layer bonded to the intermediate layer, said composite sliding structure being characterized in that:

the surface layer is made of any one selected from the group consisting of (a) an alloy consisting of 0.1–6.0% Cu and the balance Pb, (b) and alloy consisting of 0.1–6.0% Cu, 0.5–16.0% In, 0.0–4.0% Sn and the balance Pb, (c) an alloy consisting of 0.5–16.0% In, 0.0–4.0% Sn and the balance Pb;

the bond layer being made of any one selected from the group consisting of an alloy consisting of 0.5–20.0% Zn and the balance N, and an alloy consisting of 0.1–4% Sn and the balance Ni;

the intermediate layer being made of any one selected from the group consisting of a single substance Al, an alloy consisting of 1.0–13.0% Si, 1.5–6.0% Zn, 4.0% or less of one or more elements selected from the group consisting of Cu, Mn, Cr, Zr, V, Pb and Sb and the balance Al, an alloy consisting of 1.5–13.0% Si, 40% or less of one or more elements selected from the group consisting of Cu, Mn, Cr, Zr, V, Pb and Sb and the balance Al, and an alloy consisting of 0.1–4% Sn, 4.0% or less of one or more elements selected from the group consisting of Cu, Mn, Cr, Zr, V, Pb and Sb and the balance Al; and

the backing metal layer being made of a hard support material.

4,877,697
COLOR FILTER ARRAY FOR LIQUID CRYSTAL DISPLAY DEVICE

Hansjoerg W. Vollmann, Bad-Neuenhain, Fed. Rep. of Germany; George S. K. Wong, Fort Lee, and Dennis Bellville, Phillipsburg, both of N.J., assignors to Hoechst Aktiengesellschaft, Frankfurt, Fed. Rep. of Germany and Hiechst Celanese Corporation, Somerville, N.J.

Filed May 26, 1988, Ser. No. 198,985
Int. Cl.[4] C09K *19/00;* **G02F** *1/13*
U.S. Cl. 430—20 **20 Claims**

1. A method for producing a display device which comprises forming an array of display electrodes on a surface of a first panel; forming an array of colored filter elements on either side of said first panel in register with said array of display electrodes; forming a counter electrode on a second panel; disposing the first and second panels spaced apart from one another with the display electrodes facing the counter electrode; and confining display material between the spaced first and second panels; wherein at least one of said panels and the electrode or electrodes on said panel is transparent and wherein said colored filter elements are formed by:

(A) providing a colored photosensitive element which comprises, in order:

(i) a substrate having a release surface; and

(ii) a photosensitive layer on said release surface, which photosensitive layer comprises a light sensitive component selected from the group consisting of negative working, polymeric diazonium compounds, positive working quinone diazide compounds; and photopolymerizable compositions; and a resinous binder composition, which composition contains a major amount of at least one resin selected from the the group consisting of a polyvinyl butyral polymer, a polyvinyl alcohol/vinyl acetate/vinyl acetal terpolymer and a styrene-maleic anhydride copolymer half ester; and at least one colorant; and

(iii) an adhesive layer directly adhered to said colored photosensitive layer, which adhesive layer comprises a polyvinyl acetate polymer or vinyl acetate containing copolymer and which adhesive layer has a softening point in the range of from about 60° C. to about 180° C.; and

(B) either

(i) laminating said element with heat and pressure via said adhesive layer to one side of said first panel and removing said substrate by the application of peeling forces; and imagewise exposing said photosensitive layer to actinic radiation; or

(ii) imagewise exposing said photosensitive layer to actinic radiation; and laminating said element with heat and pressure via said adhesive layer to one side of first panel; and removing said substrate by the application of peeling forces; or

(iii) laminating said element with heat and pressure via said adhesive layer to one side of said first panel; and imagewise exposing said photosensitive layer to actinic radiation; and removing said substrate by the application of peeling forces; and then

(C) removing the non-image areas of said photosensitive layer with a liquid developer, which removing is conducted at a temperature at which said adhesive layers are substantially non-tacky; and thereafter

(D) optionally repeating steps A through C at least once whereby another photosensitive element having at least one different colorant is laminated onto one side of said first panel over the non-removed portions of the previously laminated photosensitive layer or layers.

4,877,698
ELECTROPHOTOGRAPHIC PROCESS FOR GENERATING TWO-COLOR IMAGES USING LIQUID DEVELOPER

P. Keith Watson, Rochester; Ian D. Morrison, Webster, both of N.Y., and Melvin D. Croucher, Oakville, Canada, assignors to Xerox Corporation, Stamford, Conn.

Filed May 23, 1988, Ser. No. 197,131
Int. Cl.[4] G03G *13/01, 13/10*
U.S. Cl. 430—45 **26 Claims**

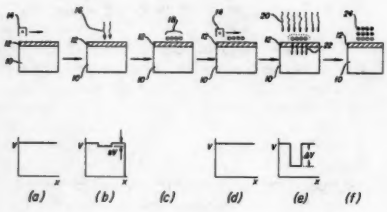
1. A process for generating two-color images, comprising: (1) charging an imaging member in an imaging apparatus; (2) creating on said member a latent image comprising areas of high, intermediate, and low potential; (3) providing an electrode having a potential within about 100 volts of that of said intermediate potential, enabling generation of an electric field and a development zone between said imaging member and said electrode; and (4) developing said latent image by introducing into said development zone a liquid developer composition containing first toner particles of one color and second toner particles of another different color, said particles being dispersed in a liquid medium, wherein said second toner particles are attracted to said high potential and said first toner particles are attracted to said low potential.

4,877,699

ELECTROPHOTOGRAPHIC LUMINESCENT AMPLIFICATION PROCESS

Ralph H. Young, and John W. May, both of Rochester, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Aug. 25, 1988, Ser. No. 236,411
Int. Cl.[4] G03G 13/22
U.S. Cl. 430—54 19 Claims



1. A method of amplifying an electrophotographic image, comprising the steps of:

a. providing a photoconductor having a filter for passing radiation of first and second wavelengths and blocking radiation of a third wavelength;

b. uniformly charging the photoconductor;

c. imagewise exposing the charged photoconductor with radiation of the first wavelength to produce a low amplitude differential voltage pattern;

d. developing the low amplitude differential voltage pattern with a luminescent toner that is excitable by radiation of the third wavelength to emit radiation of the second wavelength to form a luminescent toner image;

e. recharging the photoconductor as necessary;

f. exciting the luminescent toner image to emit radiation that produces a high amplitude differential voltage pattern in the photoconductor; and

g. developing the high amplitude differential voltage pattern to form a high density image.

4,877,700

LAYERED ELECTROPHOTOGRAPHIC RECORDING MATERIAL CONTAINING SELENIUM, ARSENIC AND BISMUTH OR TELLURIUM

Manfred Lutz, and Bernd Reimer, both of Belecke, Fed. Rep. of Germany, assignors to Licentia Patent-Verwaltungs-GmbH, Frankfurt am Main, Fed. Rep. of Germany

Continuation of Ser. No. 476,601, Mar. 18, 1983, abandoned, which is a continuation-in-part of Ser. No. 203,676, Nov. 3, 1980, Pat. No. 4,385,105, which is a continuation-in-part of Ser. No. 269,941, Jun. 3, 1981, Pat. No. 4,379,821. This application Jun. 28, 1988, Ser. No. 218,455
Claims priority, application Fed. Rep. of Germany, Mar. 20, 1982, 3210293
Int. Cl.[4] G03G 5/04
U.S. Cl. 430—58 14 Claims

1. Fatigue resistant electrophotographic recording material having a high photosensitivity which extends into the infrared range containing a dual photoconductive layer applied to an electrically conductive substrate, with each of the two photoconductive layers of the dual layer containing selenium, the dual layer consisting of a lower photoconductive layer disposed of the substrate, said lower layer consisting of an amorphous system of arsenic and selenium, and an upper photoconductive layer made of $As_{2-x}Bi_xSe_3$ or of $As_2Se_{3-y}Te_y$, where $0<x<2$ or $0<y<3$, and wherein the lower photoconductive layer disposed on the substrate is made of selenium containing arsenic in the less than stoichiometric amount of from 18 to 37 precent by weight, whereby increasing dark discharges and decreasing charging potential caused by cyclic stress fatigue are avoided.

4,877,701

PHOTOSENSITIVE MEMBER FOR ELECTROPHOTOGRAPHY

Masaaki Hiro, Ninomiya; Tomohiro Kimura, Yokohama; Hisami Tanaka, Tokyo; Noboru Kashimura, Kawasaki; Shigemori Tanaka, Tokyo; Hitoshi Tohma, and Masafumi Hisamura, both of Kawasaki, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Jul. 20, 1987, Ser. No. 75,654
Claims priority, application Japan, Jul. 24, 1986, 61-174153
Int. Cl.[4] G03G 5/14
U.S. Cl. 430—59 14 Claims

1. A photosensitive member for electrophotography comprising a photosensitive layer, at least the surface portion of which comprises a lubricant powder, and a charge-transporting substance having an oxidation potential of 0.6 volt or above.

14. A photosensitive member according to claim 1, wherein the charge-transporting substance is selected from the group consisting of hydrazone compounds, stilbene-type compounds, carbazole compounds, pyrazoline compounds, oxazole compounds, thiazole compounds, triarylmethane compounds and polyaryl alkanes.

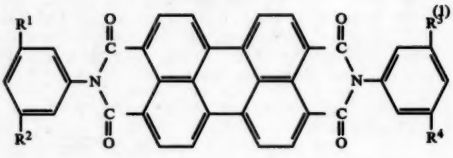
4,877,702

ELECTROPHOTOGRAPHIC SENSITIVE MATERIAL

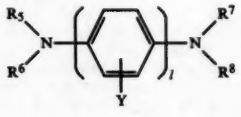
Eiichi Miyamoto, Osaka; Nariaki Mutou, Daito, and Tooru Nakazawa, Osaka, all of Japan, assignors to Mita Industrial Co., Ltd., Osaka, Japan

Filed Oct. 27, 1988, Ser. No. 263,255
Claims priority, application Japan, Oct. 30, 1987, 62-277158; Oct. 30, 1987, 62-277159; Oct. 30, 1987, 62-277161; Oct. 30, 1987, 62-277162
Int. Cl.[4] G03G 5/09
U.S. Cl. 430—72 11 Claims

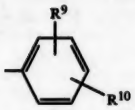
1. An electrophotographic sensitive material provided with a single-layer type sensitive layer containing an electric charge generating substance, an electric charge transferring substance, and a binding resin, characterized in that said electric charge generating substance is a perylene type compound represented by the following general formula (1) and said electric charge transferring substance is a diamine derivative represented by the following general formula (2):



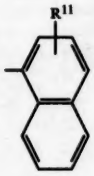
wherein R^1, R^2, R^3, and R^4 independently stand for an alkyl group of C_1 to C_6, and



wherein R^5, R^6, R^7, and R^8 independently stand for a group of the following general formula:



or



(wherein R^9, R^{10}, and R^{11} independently stand for a member selected from the group consisting of a hydrogen atom, alkyl groups of C_1 to C_6, alkoxy groups of C_1 to C_6, and halogen atoms), providing that R^5, R^6, R^7, and R^8 each stand for either of the group (3) and the group (4) or R^5 and R^7 each stand for the group (3) and R^6 and R^8 each stand for the group (4); Y stands for one member selected from the group consisting of a hydrogen atom, alkyl groups of C_1 to C_6 alkoxy groups of C_1 to C_6, and halogen atoms; and l stands for an integer in the range of 1 to 3.

4,877,703

PHOTOCONDUCTOR FOR ELECTROPHOTOGRAPHY HAVING A SQUARYLIUM CHARGE GENERATING DYE

Masami Kuroda; Yoshimasa Hattori; Noboru Furusho, and Yoshinobu Sugata, all of Kawasaki, Japan, assignors to Fuji Electric Co., Ltd., Kawasaki, Japan

Filed Dec. 14, 1988, Ser. No. 284,335

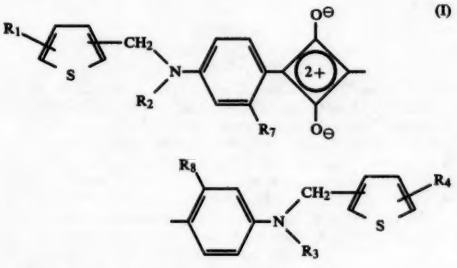
Claims priority, application Japan, Dec. 16, 1987, 62-317768; Apr. 26, 1988, 62-103678

Int. Cl.[4] G03G *15/06*

U.S. Cl. 430—76 **9 Claims**

1. A photoconductor for electrophotography comprising:

at least one squarylium compound represented by the following general formula (I) as a charge generating substance:



(I)

wherein, each of R_1, R_2, R_3 and R_4 stands for a hydrogen atom, a halogen atom, an alkyl grup, an aryl group, or a nitro group, and each of R_7 and R_8 stands for a hydrogen atom or a hydroxy group.

4,877,704

(3) PROCESS FOR DEVELOPING LATENT ELECTROSTATIC IMAGE USING TONER CONTAINING POLYESTER RESIN

Hiroyuki Takagiwa, Hachioji; Jiro Takahashi, Sagamihara; Meizo Shirose, Hino; Kunio Akimoto, Fujisawa, and Masafumi Uchida, Hachioji, all of Japan, assignors to Konishiroku Photo Industry Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 73,835, Jul. 15, 1987, abandoned, which is a continuation of Ser. No. 740,176, May 31, 1985, abandoned.

(4) **This application Apr. 28, 1988, Ser. No. 191,790**

Claims priority, application Japan, May 31, 1984, 59-109543; May 31, 1984, 59-109544; May 31, 1984, 59-109545

Int. Cl.[4] G03G *13/20*

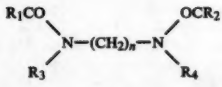
U.S. Cl. 430—99 **21 Claims**

1. In a process of developing a latent electrostatic image with a toner, then transferring and fixing the developed image and wherein the fixing is accomplished by the use of a fixing unit having a heat roll fixing unit comprising a fluorinated resin surface and a pressure roller, the improvement wherein the toner comprises

(a) a non-linear copolymer polyester resin having a side chain, said side chain comprising an aliphatic hydrocarbon group containing 3 to 22 carbon atoms, said copolymer being obtained by polymerization of (i) an etherified bisphenol monomer, (ii) a dicarboxylic acid monomer, (iii) at least one of a polyhydric alcohol monomer containing at least 3 hydroxy groups and a monomer component containing a polycarboxylic acid containing at least 3 carboxy groups and (iv) at least one monomer which forms said side chain selected from the group consisting of polyhydric alcohol monomers containing at least 2 hydroxy groups and containing a saturated or unsaturated hydrocarbon group containing 3 to 22 carbon atoms and polycarboxylic acid monomers containing at least 2 carboxy groups and containing a saturated or unsaturated hydrocarbon group containing 3 to 22 carbon atoms; and

at least one compound selected from the group consisting of

(b) and an alkylene-bis-aliphatic acid amide compound represented by the formula



wherein R_1 and R_2 are independently selected from the group consisting of saturated and unsaturated aliphatic hydrocarbon groups having not less than 10 carbon atoms, R_3 and R_4 are independently selected from a hydrogen atom and a group represented by $-OCR_5$ wherein R_5 is a saturated or unsaturated hydrocarbon group and n is a positive integer, and (c) a wax containing not less than 20% by weight of an ester component, said wax having a needle penetration degree of not more than 4.

4,877,705

PLASMA SPRAY COATED CERAMIC BODIES AND METHOD OF MAKING SAME

Jaromir J. Polidor, Pittsburgh, Pa., assignor to Vesuvius Crucible Company, Pittsburgh, Pa.

Filed Mar. 3, 1988, Ser. No. 163,669

Int. Cl.[4] B05D *1/08*; B32B *9/00*

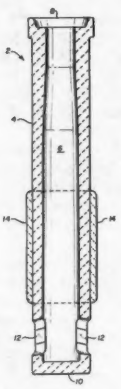
U.S. Cl. 428—34.6 **7 Claims**

1. A subentry shroud or nozzle for use in delivering molten metal below the surface of a molten slag layer in a continuous casting mold, comprising:

an elongated body member of a compacted and fired ceramic material having an internal bore extending from a first end to a second end thereof for delivering a flow of molten metal from said first end to said second end below the surface of said bath of molten material, said body

member also having an outer sidewall surface extending between said first and second ends, a portion of said outer surface adapted to contact the surface of said molten slag layer and defining a slagline area therearound; and

a plasma sprayed layer of a ceramic material coating said outer surface of the body in said slagline area, said plasma



sprayed layer having a thickness of between about 0.5 mm to about 5.0 mm and an apparent porosity of at least 15% lower than an apparent porosity of said body, whereby said plasma sprayed layer is adapted to resist corrosive and erosive attack of the molten slag layer at an attack rate lower than that of the body member.

4,877,706

SINGLE COMPONENT COLD PRESSURE FIXABLE ENCAPSULATED TONER COMPOSITIONS

Hsdi K. Mahabadi; Tie H. Ng, both of Mississauga; Nancy A. Listigovers, Oakville, and Trevor I. Martin, Burlington, all of Canada, assignors to Xerox Corporation, Stamford, Conn.

Filed May 25, 1988, Ser. No. 198,265

Int. Cl.[4] G03G *9/08*

U.S. Cl. 430—106.6 **41 Claims**

1. A cold pressure fixing toner composition comprised of a core containing a polymer component and magnetic pigment particles, and wherein the core is encapsulated within a shell comprised of the interfacial polycondensation reaction product of a first polyisocyanate component and a second amine component, which toner includes thereon an electroconductive material obtained from a water based dispersion of said material in a polymeric binder, said first polyisocyanate component being selected from the group consisting of polymethylene polyphenyl isocyanates, diphenylmethane diisocyanates, toluene diisocyanate, and tris(p-isocyanato-phenyl)-thiophosphate; and said second amine component selected from the group consisting of ethylenediamine, tetramethylenediamine, pentamethylenediamine, hexamethylenediamine, p-phenylenediamine, m-phenylenediamine, 2-hydroxy trimethylenediamine, diethylenetriamine, triethylenetetraamine, tetraethylenepentaamine, 1,8-diaminooctane, xylylene diamine, bis(hexamethylene)triamine, tris(2-aminoethyl)amine, 4,4'-methylene bis(cyclohexylamine), bis(3-aminopropyl)ethylene diamine, 1,3-bis(aminomethyl)cyclohexane, 1,5-diamino-2-methylpentane, piperazine, 2-methylpiperazine, 2,5-dimethylpiperazine, and 1,4-bis(3-aminopropyl)piperazine.

13. A cold pressure fixable toner composition comprised of a core comprising a polymer component selected from the group consisting of poly(lauryl methacrylate), poly(dodecyl acrylate), poly(stearyl methacrylate), styrene-lauryl methacrylate copolymer and poly(dodecyl styrene), and magnetic pigment particles, which core is encapsulated within a shell comprised of the interfacial polycondensation reaction product of a first component selected from the group consisting of polymethylene polyphenyl isocyanates, diphenylmethane diisocyanates, toluene diisocyanate, and tris(p-isocyanato-phenyl)-thiophosphate; and a second component selected from the group consisting of ethylenediamine, tetramethylenediamine, pentamethylenediamine, hexamethylenediamine, p-phenylenediamine, m-phenylenediamine, 2-hydroxy trimethylenediamine, diethylenetriamine, triethylenetetraamine, tetraethylenepentaamine, 1,8-diaminooctane, xylylene diamine, bis(hexamethylene)triamine, tris(2-aminoethyl)amine, 4,4'-methylene bis(-cyclohexylamine), bis(3-aminopropyl)ethylene diamine, 1,3-bis(aminomethyl)cyclohexane, 1,5-diamino-2-methylpentane, piperazine, 2-methylpiperazine, 2,5-dimethylpiperazine, and 1,4-bis(3-aminopropyl)piperazine; and wherein said toner composition includes thereon an electroconductive component obtained from a water based dispersion of said component in a polymeric binder.

4,877,707

IMAGING PROCESSES WITH COLD PRESSURE FIXABLE TONER COMPOSITIONS

Bernard Grushkin; Hui Chang, both of Pittsford, and John G. Ruhland, Rochester, all of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Filed May 26, 1988, Ser. No. 198,964

Int. Cl.[4] G03G *9/08*

U.S. Cl. 430—106.6 **16 Claims**

1. A single component pressure fixable toner composition comprised of resin particles selected from the group consisting of ethylene/propylene copolymers, ethylene-co-vinyl acetate polymers, polyamides, and mixtures thereof, magnetite, and a release fluid therein, which toner contains conductive particles on the surface thereof, and wherein the magnetite is present in an amount of from about 50 to about 80 percent by weight, and the toner has a resistivity of about 10^4 to about 10^7 ohm-cm.

4,877,708

ENCAPSULATED ELECTROSTATOGRAPHIC TONER AND METHOD FOR USE THEREOF

Noriyuki Hosoi, Fujinomiya, Japan, assignor to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Dec. 23, 1987, Ser. No. 137,827

Claims priority, application Japan, Dec. 25, 1986, 61-314424

Int. Cl.[4] G03G *13/06, 9/08*

U.S. Cl. 430—126 **8 Claims**

1. In a toner in the form of microcapsule comprising a core material enclosed with a resin shell, said core material containing a colorant and an oily medium, the improvement which comprises said oil medium containing a chlorinated paraffin having from 8 to 30 carbon atoms and a chlorination degree ranging from 8 to 40% by weight.

4,877,709

IMAGE FORMING MEMBER FOR ELECTROPHOTOGRAPHY

Eiichi Inoue, Tokyo; Isamu Shimizu, and Toshiyuki Komatsu, both of Yokohama, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Division of Ser. No. 141,158, Jan. 6, 1988, abandoned, which is a division of Ser. No. 77,102, Jul. 23, 1987, Pat. No. 4,737,428, which is a division of Ser. No. 923,027, Oct. 24, 1986, Pat. No. 4,701,394, which is a continuation of Ser. No. 358,356, Mar. 16, 1982, Pat. No. 4,673,628, which is a continuation of Ser. No. 131,495, Mar. 18, 1980, abandoned. This application Aug. 1, 1988, Ser. No. 226,556

Claims priority, application Japan, Mar. 26, 1979, 54-35313

Int. Cl.[4] G03G *5/082*

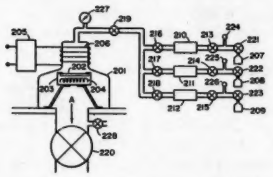
U.S. Cl. 430—128 **1 Claim**

1. A process for preparing an electrophotographic image-forming member comprising a substrate, a hydrogenated amor-

phous silicon layer containing from 1 to 40 atomic percent of hydrogen and an amorphour inorganic semiconductor layer composed of an amorphour inorganic semiconductor having band gap e_g larger than the band gap E_g of said hydrogenated amorphous silicon and having effective dark resistance for forming electrophotographic images; said hydrogenated amorphorous silicon layer being laminated to said amorphous inorganic semiconductor layer whereby a heterojunction is provided in the contact portion between the former layer and the latter layer which comprises the steps of:

(a) subjecting a substrate suitable for electrophotography to a reduced pressure in an evacuable system;

(b) introducing gasious material comprising hydrogenated



silicon gas and hydrogen gas into said system under said reduced pressure;

(c) causing an electrical discharge in said gaseous material so as to form a hydrogenated amorphous silicon layer containing from 1 to 40 atomic percent of hydrogen on the substrate while maintaining the temperature of said substrate within a predetermined temperature range;

(d) depositing amorphous inorganic semiconductor on said hydrogenated amorphous semiconductor layer by vacuum vapor deposition so as to form an amorphous inorganic semiconductor layer; and

(e) after said layer is formed, maintaining the layer under reduced pressure until the temperature of the substrate drops to or below a predetermined temperature.

4,877,710

METHOD FOR FORMING AN IMAGE COMPRISING ADHERENCE OF THE IMAGE-RECEIVING AND IMAGE-FORMING MATERIAL

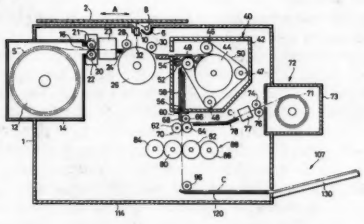
Minoru Ishikawa, Kanagawa, Japan, assignor to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Dec. 2, 1987, Ser. No. 127,308

Claims priority, application Japan, Dec. 2, 1986, 61-286001

Int. Cl.[4] G03C *1/72, 5/54*

U.S. Cl. 430—138 **3 Claims**



1. A method for forming an image comprising the steps of:

(a) imagewise exposing a light-sensitive material comprising a support having thereon a light-sensitive layer containing an image-forming material encapsulated in synthetic high molecular resin microcapsules containing a vinyl compound, a photo-polymerization initiator, and a color dye precursor as an image-forming material;

(b) superposing thereon an image-receiving material comprising a support having thereon an image-receiving layer in contact with the outermost layer of said light-sensitive material;

(c) applying sufficient pressure to said superposed materials to imagewise rupture at least part of said microcapsules, to transfer an image from said light-sensitive layer to said image-receiving layer, and to adhere said light-sensitive material and said image-receiving material to form a unitary structure; at least one of said support for said light-sensitive material and said support for said image-receiving material being transparent.

4,877,711

LIGHT-SENSITIVE DIAZO PHOTOPOLYMERIZABLE COMPOSITION WITH POLYURETHANE HAVING CARBON-CARBON UNSATURATED AND A CARBOXYL GROUP

Toshiaki Aoai; Kazuo Maemoto; Akihiko Kamiya, and Hiroshi Misu, all of Shizuoka, Japan, assignors to Fuji Photo Film Co., Ltd., Minami-Ashigara, Japan

Filed May 12, 1987, Ser. No. 48,949

Claims priority, application Japan, May 19, 1986, 61-114342

Int. Cl.[4] G03C *1/60, 1/70*

U.S. Cl. 430—176 **14 Claims**

1. A light-sensitive composition which comprises an admixture of a polyurethane resin having a carbon-carbon unsaturated bond and a carboxyl group, a monomer having at least one polymerizable, ethylenically unsaturated group, a photopolymerization initiator and/or a sensitizer and a diazonium compound,

wherein the polyurethane resin has a basic skeleton of a reaction product of a diisocyanate compound represented by the following general formula (I) with a diol compound having a carboxyl group represented by general formula (II) or (III);

$$OCN-R_1-NCO \quad (I)$$

$$HO-R_3-\underset{\displaystyle R_5}{\overset{\displaystyle R_2}{\underset{|}{\overset{|}{C}}}}-R_4-OH \quad (II)$$

$$\qquad\qquad\quad COOH$$

$$HO-R_3-\underset{\displaystyle R_5}{\underset{|}{Ar}}-R_4-OH \quad (III)$$

$$\qquad\qquad\quad COOH$$

wherein, R_1 represents a divalent aliphatic or aromatic hydrocarbon which may have substituents; R_2 represents a hydrogen atom, alkyl, alkenyl, aralkyl, aryl, alkoxy or aryloxy group, all of which may have substituents; R_3, R_4 and R_5 may be same or different and represent a single bond or divalent aliphatic or aromatic hydrocarbon which may have substituents; or two or three out of R_2, R_3, R_4 and R_5 may form a ring; and Ar represents a trivalent aromatic hydrocarbon which may have substituents, and the carbon-carbon unsaturated bond is introduced into the polyurethane resin by:

(a) reacting a part of carboxyl groups of the compound of general formula (II) or (III) with a halogen compound or epoxy compound having a carbon-carbon unsaturated bond in the presence of a base, or

(b) using a diol compound having a carbon-carbon unsaturated bond together with the diol compound of general formula (II) or (III), and the reaction product of said diisocyanate compound and said diol compound does not contain an isocyanate group.

4,877,712
IMAGE FORMING PROCESS

Tomizo Namiki; Kazuo Suzuki, and Fumiaki Shinozaki, all of Shizuoka, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed May 27, 1988, Ser. No. 199,822
Claims priority, application Japan, May 29, 1987, 62-134483; Dec. 8, 1987, 62-311638
Int. Cl.[4] G03C *1/90, 11/12*
U.S. Cl. 430—256 9 Claims

1. An image-forming process comprising the steps of:

(A) transferring an image layer, formed on a transferable light-sensitive material, onto an image-receiving sheet, and

(B) transferring the image layer onto a permanent support,

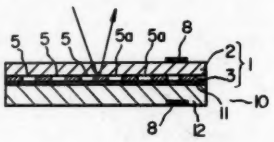
wherein the image-receiving layer of the image-receiving sheet contains a fluorine-series surface active agent in an amount of from 2 to 40% by weight based on the entire weight of the image-receiving layer, wherein said surface active agent comprises a copolymer of (i) from 10 to 70% by weight of a fluoroaliphatic group-containing acrylate or methacrylate component, and (ii) from 90 to 30% by weight of a poly(oxyalkylene) acrylate or methacrylate component, and wherein said fluoroaliphatic group is a fluoraliphatic group having from 3 to 20 carbon atoms and contains at least 40% by weight of fluorine, wherein at least 3 carbon atoms of the terminal moiety are fluorinated and

wherein the image-receiving sheet comprises a support having formed thereon an image-receiving layer composed of a composition containing an organic high molecular material as the main component, wherein adhesion P_1 between the support of the image-receiving sheet and the image-receiving layer and adhesion P_2 between the image-receiving layer and the image layer are higher than adhesion P_3 between the image layer and the support of the transferable light-sensitive material, and also adhesion P_4 between the permanent support and the image layer and adhesion P_1 are higher than adhesion P_2, and wherein the image layer is transferred onto the permanent support via the image-receiving sheet without transferring the image-receiving layer onto the permanent support.

4,877,713
PREFORMATTED OPTICAL RECORDING CARD AND METHOD OF PRODUCING THE SAME

Minoru Fujita, and Yoichi Fukushima, both of Tokyo, Japan, assignors to Kyodo Printing Co., Ltd., Tokyo, Japan

Filed Jan. 16, 1987, Ser. No. 4,119
Claims priority, application Japan, Jan. 21, 1986, 61-10911
Int. Cl.[4] G03C *3/00;* G11B *7/00*
U.S. Cl. 430—270 5 Claims



1. A preformatted optical recording card comprising

a transparent front base plate and a rear base plate adhesively secured to each other,

an optical reflective film having an arrangement of preformatting pits formed within the reflective film, the reflective film with the pits being disposed on an inside surface of said transparent front base plate,

an optical recording film disposed within said pits and on said reflective film, and wherein

said preformatting pits are formed by photo-etching.

2. A method of producing a preformatted optical recording card having a front base plate to be adhesively secured to a rear base plate, comprising the steps of:

forming an optical reflective film on a surface of a transparent front base plate,

forming a layer of resist on said optical reflective film,

exposing said layer of resist to a light beam which passes through a mask having a pattern corresponding to an arrangement of a plurality of preformatting pits,

developing the layer of resist to produce a plurality of pits in the optical reflective film by etching in accordance with said pattern, etching of the reflective film producing a plurality of pits in accordance with said pattern,

removing the residual resist, and

depositing an optical recording film within said pits and on said reflective film.

4. A method of producing a preformatted optical recording card having a front base plate to be adhesively secured to a rear base plate, comprising of steps of

forming a layer of resist on a surface of a transparent front base plate,

exposing said layer of resist to a light beam which passes through a mask having a pattern corresponding to an arrangement of a plurality of preformatting pits,

developing the layer of resist to produce a plurality of holes by etching in accordance with said pattern corresponding to the arrangement of the preformatting pits,

forming an optical reflective film on the layer of resist and on exposed portions of said surface on the front base plate,

removing the residual resist in accordance with a resist lift-off process to produce an array of pits in the reflective film, and

depositing an optical recording film within said pits and on said reflective film.

4,877,714
PHOTOSENSITIVE AQUEOUS EMULSION RESIN COMPOSITION OF POLYSTYRENE OR STYRENE COPOLYMER PARTICLES CONTAINING PHOTOSENSITIVE MATERIAL

Tahahiro Tsunoda; Tsuguo Yamaoka, both of Funabashi, and Seiji Arimatsu, Neyagawa, all of Japan, assignors to Nippon Paint Company, Osaka, Japan

Continuation of Ser. No. 40,173, Apr. 17, 1987, abandoned, which is a continuation of Ser. No. 893,257, Aug. 4, 1986, abandoned, which is a continuation of Ser. No. 719,703, Apr. 4, 1985, abandoned, which is a continuation of Ser. No. 641,099, Aug. 15, 1984, abandoned, which is a continuation of Ser. No. 470,718, Feb. 28, 1983, abandoned, which is a continuation of Ser. No. 233,571, Feb. 11, 1981, abandoned. This application Aug. 25, 1988, Ser. No. 236,636
Claims priority, application Japan, Feb. 15, 1980, 55-18169
Int. Cl.[4] G03C *1/76*
U.S. Cl. 430—270 4 Claims

1. A photosensitive aqueous emulsion consisting essentially of an aqueous medium and a sufficient amount of polymeric resin particles dispersed in said medium to form said emulsion; said polymeric resin particles being formed by emulsion polymerization of monomers selected from styrene in an amount not less than 40% by weight of said polymeric resin, vinyl acetate in an amount not more than 40% by weight of said polymeric resin, and ethyl acrylate in an amount not more than 40% by weight of said polymeric resin; said polymeric resin particles also containing at least one member present in said emulsion polymerization and selected from the group consisting of (i) a photo-reactive compound chosen from water-insoluble azides and bisazides in an amount of about 1–20% by weight of said polymeric resin, and (ii) a photo-initiator chosen from aromatic ketones in an amount of about 0.1–20% by weight of said polymeric resin, with the total content of said photo-reactive compound and said photo-initiator being not more than 20% by weight of said polymeric resin; and said

photosensitive aqueous emulsion having a minimum film-forming temperature of not lower than 10° C. whereby said resin particles do not coalesce into a continuous film when said emulsion is applied to a substrate and dried.

4,877,715

LIGHT SENSITIVE RECORDING ELEMENT HAVING A PHOTOPOLYMERIZABLE RELIEF-FORMING LAYER CONTAINING AN ETHYLENE TERPOLYMER

Horst Koch, Grosskarlbach, and Walter Ziegler, Edingen-Neckarhausen, both of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Division of Ser. No. 932,355, Nov. 19, 1986, Pat. No. 4,777,115.
This application Jul. 6, 1988, Ser. No. 215,543
Claims priority, application Fed. Rep. of Germany, Nov. 19, 1985, 3540950
Int. Cl.[4] G03C *1/76*
U.S. Cl. 430—271 12 Claims

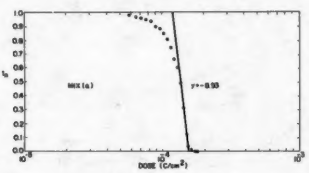
12. The light sensitive recording element of claim 8, wherein said comonomer (a_3) is an acrylic acid ester selected from the group consisting of n-butyl acrylate, 2-ethyl-hexyl acrylate and ω-methyl-poly(ethylene oxide)-α-yl acrylate.

4,877,716

DEVELOPER SOLUTIONS FOR PMMA ELECTRON RESIST

Gary Bernstein, Tempe; David K. Ferry, Chandler, and Wenping Liu, Tempe, all of Ariz., assignors to Arizona Board of Regents, Tempe, Ariz.

Filed Feb. 24, 1988, Ser. No. 159,777
Int. Cl.[4] G03C *5/34, 5/24*
U.S. Cl. 430—309 7 Claims



1. An improved developer for PMMA electron resist, said developer comprising from 0.5 to 5 percent by volume of methylethylketone:ethanol in a ratio of 23.5:76.5 (v/v), in intimate mixture with a developer selected from the group consisting of from methylisobutylketone:2-propanol in a ratio of 25:75 (v/v) and 2-ethoxyethanol:methanol in a ratio of 3:7 (v/v) alone or in combination.

4,877,717

PROCESS FOR THE PRODUCTION OF OPTICAL ELEMENTS

Toshihiro Suzuki, Kawasaki; Yasuyuki Todokoro, and Kazunari Komenou, both of Atsugi, all of Japan, assignors to Fujitsu Limited, Kawasaki, Japan

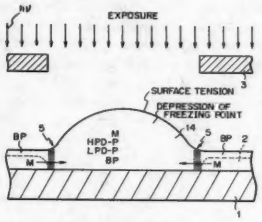
Filed Jul. 24, 1987, Ser. No. 77,337
Claims priority, application Japan, Jul. 26, 1986, 61-174719; Aug. 28, 1986, 61-200102; Sep. 19, 1986, 61-219782; Sep. 19, 1986, 61-219785; Mar. 19, 1987, 62-062426
Int. Cl.[4] B29D *11/00;* G02B *1/04;* G03C *1/68*
U.S. Cl. 430—321 24 Claims

1. A process for the production of an optical element, without a development step following an exposure step, which comprises the steps of;

forming on a substrate a light-sensitive film containing at least a photoreactive compound which, when selectively exposed to radiation, can cause migration of unreacted photoreactive compound from unexposed areas to exposed areas adjacent to the unexposed areas in addition to the reaction of the photoreactive compound in the exposed areas;

selectively exposing the light-sensitive film to radiation; and

causing migration, as a result of the selectively exposing, of



the unreacted compound in the unexposed areas into the exposed areas and reaction of the photoreactive compound in the exposed area to change a configuration of the exposed areas to conform with a desired configuration of the optical element.

4,877,718

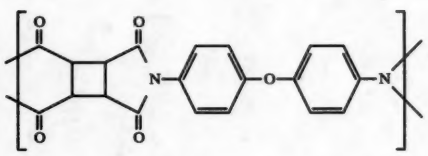
POSITIVE-WORKING PHOTOSENSITIVE POLYIMIDE OPERATED BY PHOTO INDUCED MOLECULAR WEIGHT CHANGES

James A. Moore; Andrew N. Dasheff, both of Troy, and Frank B. Kaufman, Amawalk, all of N.Y., assignors to Rennsselaer Polytechnic Institute, Troy and International Business Machines Corporation, Armonk, both of, N.Y.

Filed Sep. 26, 1988, Ser. No. 249,393
Int. Cl.[4] G03C *5/16*
U.S. Cl. 430—326 6 Claims

1. A method of forming a patterned layer for a semiconductor structure comprising:

forming a layer of insoluble polyimide having the formula:



irradiating the layer with a pattern of ultraviolet light to produce exposed and unexposed areas in the layer, the exposed areas becoming soluble; and

dissolving the exposed areas from the layer using a solvent to form the patterned layer.

4,877,719

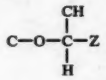
PROCESS FOR PREPARING IMAGE-BEARING PLATES

Tatsuji Higashi, and Nobuyuki Kita, both of Shizuoka, Japan, assignors to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan

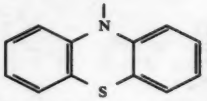
Filed Oct. 14, 1986, Ser. No. 918,126
Claims priority, application Japan, Oct. 18, 1985, 60-232470
Int. Cl.[4] G03C *5/16*
U.S. Cl. 430—326 9 Claims

1. A process for preparing an image-bearing plate which comprises the steps of: imagewise exposing a light-sensitive plate comprising a substrate having provided thereon a light-sensitive layer comprising (a) 0.01 to 10% by weight of a compound capable of producing an acid upon irradiation with actinic rays, (b) 10 to 40% by weight of a compound having at least one acid-decomposable group wherein the product

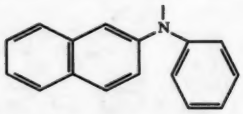
formed by the reaction between said acid and said compound has a solubility, in a developing solution, higher than that of said compound having the acid-decomposable group, and (c) 60 to 90% by weight of an alkali-soluble resin; treating the exposed light-sensitive plate with hot water of 30° C. to 50° C. for a period of at least 10 seconds, and removing the exposed area with an aqueous alkali solution from the plate, wherein said compound having at least one acid-decomposable group is selected from the group consisting of silylether group-containing compounds; acetal or ketal group-containing compounds; enolether group-containing compounds; N-acyliminocarbonate group-containing compounds; orthocarboxylic acid ester group-containing compounds; compounds containing a group expressed by the formula:



in which Z is selected from the group consisting of —OAr, —$NRSO_2Ar$,



and



where Ar is monovalent or divalent aromatic group and R is lower alkyl group; and polymeric compounds of aromatic 1,2-dialdehyde.

4,877,720

SILVER HALIDE PHOTOGRAPHIC MATERIAL

Kozo Sato; Shigeru Ohno, and Sumito Yamada, all of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Apr. 29, 1988, Ser. No. 188,583

Claims priority, application Japan, Apr. 30, 1987, 62-106888

Int. Cl.[4] G03C *1/10, 1/34, 1/42*

U.S. Cl. 430—512 **18 Claims**

1. A silver halide photographic material comprising a support having thereon at least one silver halide emulsion layer, at least one layer of said silver halide photographic material comprising at least one compound represented by formula (I):

$$PWR—Time_t—POL \quad (I)$$

wherein PWR represents a group capable of releasing Time—$_t$—POL upon reduction; Time represents a divalent organic group capable of releasing POL via a subsequent reaction after (Time$_t$POL is released from PWR; t is 0 or 1; and POL represents a polymer group.

4,877,721

PHOTOGRAPHIC SILVER HALIDE ELEMENTS CONTAINING FILTER DYES

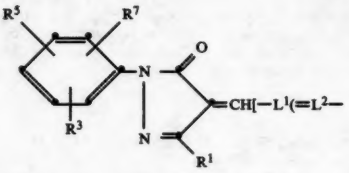
Donald R. Diehl, Rochester, and Ralph C. Reed, Brockport, both of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

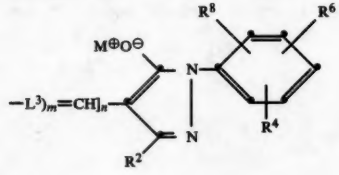
Continuation-in-part of Ser. No. 50,592, May 14, 1987, abandoned, which is a continuation-in-part of Ser. No. 863,667, May 15, 1986, abandoned. This application Aug. 23, 1988, Ser. No. 235,772

Int. Cl.[4] G03C *1/84*

U.S. Cl. 430—522 **9 Claims**

1. A photographic element comprising a support having thereon a radiation-sensitive silver halide emulsion layer and a hydrophilic colloid layer, which is the same as or different than the silver halide layer, comprising from about 1 to 1000 mg/m^2 of a dye having the formula:





wherein

R^1 and R^2 represent an aliphatic, alicyclic, or aromatic acyl group;

R^3, R^4, R^5, R^6, R^7, and R^8 each represent hydrogen or an acidic substituent capable of forming an anion, provided that (a) at least four of R^3, R^4, R^5, R^6, R^7, and R^8 are acidic groups and (b) at least two of such acidic groups are other than carboxy;

L^1, L^2, and L^3 each represent CH or CR where R is alkyl of up to four carbons; and

$M^{\oplus}$ represents hydrogen or a monovalent cation and m and n each may be 0 or 1.

4,877,722

COLOR PHOTOGRAPHIC RECORDING MATERIAL DEVELOPABLE BY HEAT

Manfred Peters; Manfred Becker; Kaspar Wingender, all of Leverkusen; Thomas Kaluschke, Leichlingen, and Sieghart Klötzer, Cologne, all of Fed. Rep. of Germany, assignors to AGFA-Gevaert Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Continuation of Ser. No. 50,674, May 18, 1987, abandoned. This application Dec. 30, 1988, Ser. No. 293,533

Claims priority, application Fed. Rep. of Germany, May 30, 1986, 3618141

Int. Cl.[4] G03C *5/54, 7/26*

U.S. Cl. 430—559 **8 Claims**

1. A colour photographic recording material developable by heat treatment, comprising at least one light-sensitive silver halide emulsion layer and a non-diffusible dye-releasing compound that release a diffusible dye associated therewith and containing in a light-sensitive layer or in a light-insensitive layer an organic base or base precursor as a development activating compound, wherein the silver halide grains in at

least one silver halide emulsion layer consist mainly of silver bromide and silver iodide and have at least three zones differing in their local iodide content consisting of a core, an outermost shell and at least one intermediate zone between said core and said outermost shell; the local iodide content in the outermost shell is 0–10 mol-%; the local iodide content in at least one intermediate zone is higher than the local iodide content in the core and higher than the iodide content in the outermost shell; the maximum local iodide content in an intermediate zone is higher by at least 6 mol-% than the minimum local iodide content in a zone further away from the core.

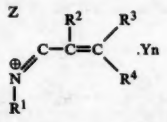
4,877,723

SILVER HALIDE PHOTOGRAPHIC MATERIAL COMPRISING A SPECIFIED NUCLEATING AGENT

Shigeo Hirano; Noriyuki Inoue, and Tatsuo Heki, all of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Nov. 6, 1987, Ser. No. 117,725
Claims priority, application Japan, Nov. 10, 1986, 61-266866
Int. Cl.[4] G03C *1/48, 1/06*
U.S. Cl. 430—598 **10 Claims**

1. A silver halide photographic material which comprises a support having provided thereon at least one photosensitive silver halide photographic emulsion layer, wherein the emulsion layer or at least one of the other hydrophilic colloid layers contains at least one nucleating agent which is an alkynyl-substituted heterocyclic quaternary ammonium salt represented by the formula:



(I)

wherein Z represents a group of non-metallic atoms required to form a 5- to 6-membered heterocyclic ring, R^1 represents an aliphatic group, R^2, R^3 and R^4, which may be the same or different, each represents a hydrogen atom, an aliphatic group, or an aromatic group, at least one of R^1, R^2, R^3, R^4 and Z has at least one substituent having an alkynyl group, Y represents a counter ion for the charge balance, and n is a number required for change balance.

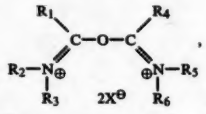
4,877,724

METHOD AND COMPOSITION FOR HARDENING GELATIN

Chung Y. Chen, Rochester; Edgar E. Riecke, Webster; Kenneth G. Harbison, and Derek D. Chapman, both of Rochester, all of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Continuation-in-part of Ser. No. 22,192, Mar. 5, 1987, abandoned. This application Aug. 31, 1988, Ser. No. 238,665
Int. Cl.[4] G03C *1/30*
U.S. Cl. 430—621 **29 Claims**

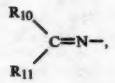
1. A method for hardening gelatin, comprising combining gelatin and a compound of the formula:



wherein R_1 represents hydrogen, alkyl of 1 to 20 carbon atoms, aralkyl of 7 to 20 carbon atoms, aryl of 6 to 20 carbon atoms, alkenyl of 2 to 20 carbon atoms, $—YR_7$,

the group

or the group



wherein Y represents sulfur or oxygen, and R_7, R_8, R_9, R_{10}, and R_{11} each independently represents alkyl of 1 to 20 carbon atoms, aralkyl of 7 to 20 carbon atoms, aryl of 6 to 20 carbon atoms, or alkenyl of 2 to 20 carbon atoms, or R_8 and R_9 together form a heterocyclic ring, or R_{10} and R_{11} are each independently hydrogen or together form a ring structure, or R_1 together with R_2 or R_3 forms a heterocyclic ring,

R_2 and R_3 each independently represents alkyl of 1 to 20 carbon atoms, aralkyl of 7 to 20 carbon atoms, aryl of 6 to 20 carbon atoms, or alkenyl of 2 to 20 carbon atoms, or, taken together with R_1 or each other, forms a heterocyclic ring,

R_4, R_5, and R_6 are defined as are R_1, R_2, and R_3, respectively, and are the same as or different from R_1, R_2, or R_3, and

$X^{\ominus}$ represents an anion or an anionic portion of the compound to form an intramolecular salt.

4,877,725

IMMUNOASSAYS FOR ANTIBODIES WHICH BIND TO THE ACQUIRED IMMUNODEFICIENCY VIRUS

Alexander R. Neurath, and Nathan Strick, both of New York, N.Y., assignors to New York Blood Center, Inc., New York, N.Y.

Filed Apr. 1, 1985, Ser. No. 718,140
Int. Cl.[4] G01N *53/00*
U.S. Cl. 435—5 **13 Claims**

1. A process for the detection of antibodies to HTLV III/-LAV comprising:

(A) mixing an unknown serum sample with a crude HTLV III/LAV viral antigen selected from the group consisting of

(1) an antigen prepared by

(i) propagating HTLV III virus infected cells in a culture medium;

(ii) separating the cells out of the medium of step (1)(i);

(iii) precipitating proteins and virus out from the resultant medium of step (1)(ii);

(iv) inactivating the virus from the product of step (1)(iii) and releasing P24 core protein and Penv protein; and

(v) recovering P24 core protein and Penv protein;

(2) a P24 antigen prepared by

(i) propagating HTLV III/LAV virus infected cells in a culture medium;

(ii) separating the cells out of the medium of step (2)(i);

(iii) precipitating proteins and virus out from the resultant medium of step (2)(ii);

(iv) inactivating and disrupting the virus from the product of step (2)(iii), and

(v) separating out the HTLV III/LAV P24 antigen; and

(3) a Penv antigen prepared by

(i) propagating HTLV III/LAV virus infected cells in a culture medium;

(ii) separating the cells out of the medium of step (3)(i);

(iii) precipitating proteins and virus out from the resultant medium of step (3)(ii);

(iv) inactivating and disrupting the virus from the product of step (3)(iii), and

(v) separating out the HTLV III/LAV Penv antigen;
(B) incubating the resultant mixture from step (A);
(C) contacting the resultant mixture of step (B) with a solid substrate coated with antibody to HTLV III/LAV;
(D) incubating the resultant mass from step (C);
(E) washing the resultant mass from step (D);
(F) contacting the resultant mass from step (E) with a labeled antibody to HTLV III/LAV;
(G) incubating the resultant mass from step (F);
(H) washing the resultant mass from step (G);
(I) assaying the label in the resultant mass from step (H);
(J) as a negative control, mixing a serum sample known to be negative to HTLV III/LAV antibody with a diluent;
(K) subjecting the resultant mass from step (J) to steps (B) to (I);
(L) as a positive control, mixing a predetermined amount of said crude HTLV III/LAV viral antigen and said diluent;
(M) subjecting the resultant mass from step (L) to steps (B) to (I); and
(N) comparing the results of the assay for the label from steps (I), (K) and (M).

4,877,726

METHOD FOR THE DETECTION OF ACUTE-PHASE TOXOPLASMA INFECTION

Yasuhiro Suzuki; Jack S. Remington, both of Menlo Park, Calif.; Georges Desmonts, and Philippe Thulliez, both of Paris, France, assignors to Research Institute of Palo Alto Medical Foundation, Palo Alto, Calif.

Filed Mar. 2, 1988, Ser. No. 163,300
Int. Cl.[4] G01N *33/569*; C07K *15/04*
U.S. Cl. 435—7 **11 Claims**

1. A method of detecting toxoplasma infection and distinguishing acute infection from chronic infection, comprising:
combining (1) a sample suspected of containing antibodies to toxoplasma antigens with (2) an acute-phase-specific toxoplasma antigen reactive with an antibody specific for an actone-treated acute-phase-specific toxoplasma antigen, wherein said combining occurs under conditions favorable for formation of antigen-antibody complex; and
detecting formation of a complex between IgG antibodies in said sample and said acute-phase-specific toxoplasma antigen as being diagnostic of acute infection.

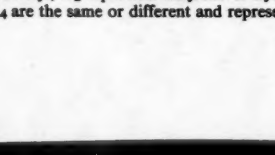
4,877,727

SUBSTRATE FOR DETERMINING LEUCINE AMINOPEPTIDASE OR GAMMA-GLUTAMYLTRANSPEPTASE ACTIVITY

Akira Miike, Shizuoka; Yukio Katsumata, Susono, and Toshio Tatano, Numazu, all of Japan, assignors to Kyowa Medex Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 698,623, Feb. 6, 1985, abandoned. This application Sep. 20, 1988, Ser. No. 248,347
Claims priority, application Japan, Feb. 7, 1984, 59-20194
Int. Cl.[4] C12Q *1/36, 1/26*
U.S. Cl. 435—24 **14 Claims**

1. A test composition for the determination of leucine aminiopeptidase (LAP) or γ-glutamyltranspeptidase (γ-GTP) activity in a sample which comprises a substrate for the LAP or γ-GTP represented by the formula (I):



(I)

wherein Z represents $(CH_3)_2CHCH_2CH(NH_2)$— or $(NH_2)(COOH)CHCH_2CH_2$—, R_1 represents hydrogen, alkyl or substituted alkyl, R_2 represents alkylene or hydroxyalkylene, R_3 and R_4 are the same or different and represents hydrogen, halogen, nitro, hydroxyl, sulfo, carboxyl, alkyl, and alkoxy, and salts thereof, and a chromogen for reacting with a compound formed from the substrate (I) by action of the LAP or γ-GTP to form a pigment proportional to LAP or GTP activity in a sample.

4,877,728

BIOTRANSFORMATION OF L-TYROSINE AND L-PHENYLALANINE TO 2,5-DIHYDROXYPHENYLACETIC ACID FOLLOWED BY POLYMERIZATION TO MELANIN PIGMENTS

Ramunas Bigelis, Elkhart, and Kathleen A. Black, Bristol, both of Ind., assignors to Miles Inc., Elkhart, Ind.

Filed Mar. 28, 1988, Ser. No. 172,770
Int. Cl.[4] C12P *21/00, 21/06, 7/42*
U.S. Cl. 435—68 **3 Claims**

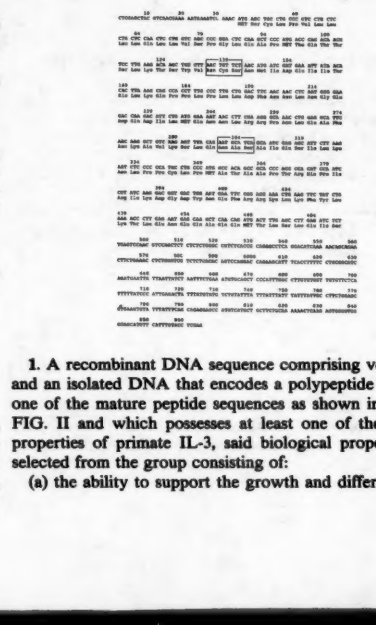
1. A method for the production of a melanin pigment which is the polymerization product of homogentisic acid which method comprises growing a fungus which has been mutated to provide a strain which is unable to grow on L-tyrosine and/or L-phenylalanine as the sole carbon source in a nutrient growth medium or a synthetic minimal medium containing a polypeptide containing one or both of these amino acids which medium contains a sub-optimal concentration of carbohydrate assimilable by the fungus, for a period of time and under conditions suitable for the degradation of the polypeptide thereby liberating L-tyrosine, L-phenylalanine and other amino acids resulting in the production of homogentisic acid and to permit the catabolism of the liberated amino acids to form ammonia thereby raising the pH of the medium to a level of at least about 10 to cause the homogentisic acid to polymerize thereby forming the melanin pigment.

4,877,729

RECOMBINANT DNA ENCODING NOVEL FAMILY OF PRIMATE HEMATOPOIETIC GROWTH FACTORS

Steven C. Clark, Winchester; Agnes B. Ciarletta, Tewksbury, and Yu-Chung Yang, Arlington, all of Mass., assignors to Genetics Institute, Inc., Cambridge, Mass.

Continuation-in-part of Ser. No. 885,060, Jul. 14, 1986, abandoned, and Ser. No. 893,764, Aug. 6, 1986, abandoned. This application Oct. 7, 1986, Ser. No. 916,335
Int. Cl.[4] C12P *21/02*; C12N *15/00, 1/00*
U.S. Cl. 435—68 **12 Claims**



1. A recombinant DNA sequence comprising vector DNA and an isolated DNA that encodes a polypeptide comprising one of the mature peptide sequences as shown in FIG. I or FIG. II and which possesses at least one of the biological properties of primate IL-3, said biological properties being selected from the group consisting of:
(a) the ability to support the growth and differentiation of

primate progenitor cells committed to erythroid, lymphoid and myeloid lineages;

(b) the ability to stimulate granulocytic colonies and erythroid bursts in a standard human bone marrow assay;

(c) the ability to sustain the growth of primate pluripotent precurser cells; and,

(d) the ability, at 10 to 100 picomolar concentrations, to stimulate primate chronic myelogenous leukemia (CML) cells in the CML assay.

4,877,730

MICROBIOLOGICAL METHOD FOR PRODUCING ETHYLENE

Sueo Urushizaki, Sakura; Yasuo Ohta, Tsu; Mamoru Sato; Sakai: Fukumi, both of Ibaraki, and Koushi Nishiyama, Yatabe, all of Japan, assignors to Director of National Institute of Agrobiological Resources, Ibaraki, Japan

Filed Jul. 28, 1986, Ser. No. 891,254

Claims priority, application Japan, Aug. 23, 1985, 60-184299

Int. Cl.[4] G12P *5/02, 7/00*

U.S. Cl. 435—132 **7 Claims**

1. A method for microbiologically producing ethylene which comprises culturing a bacterial microorganism of *Pseudomonas syringae* pv. *glycinea* in a culture medium to form ethylene and collecting said ethylene and wherein the microorganism is selected from the group consisting of the strains of *P. syringae* pv. *glycinea* KN 38 (IFO 14517), KN 41 (IFO 14518) and KN 50 (IFO 14519).

4,877,731

FERMENTATION PROCESS FOR CARBOXYLIC ACIDS

Lorraine B. Ling, Newark, Del., and Thomas K. Ng, Chadds Ford, Pa., assignors to E. I. Du Pont De Nemours and Company, Wilmington, Del.

Filed Jun. 27, 1988, Ser. No. 212,300

Int. Cl.[4] C12P *7/44, 7/46, 7/42;* C12R *1/845*

U.S. Cl. 435—142 **15 Claims**

1. In a fermentation process for producing carboxylic acids selected from the group consisting of fumaric acid, succinic acid, malic acid and mixtures thereof by growing fungi of the genus Rhizopus in a culture media comprising a carbon source, a nitrogen source and inorganic salts, wherein the process involves a cell-growth phase and an acid production phase, the improvement comprising growing said fungi under conditions of controlled dissolved oxygen availability in the culture medium, wherein the concentration of oxygen dissolved in the culture medium is maintained between about 80% and 100% of saturation for the cell-growth phase and between about 30% and 80% of saturation for the acid production phase.

4,877,732

BIOCHEMICAL PROCESS FOR THE PREPARATION OF NEW ORGANOFLUORINE COMPOUNDS

John A. Schofield, Kent, England, assignor to Shell Oil Company, Houston, Tex.

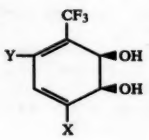
Filed Jul. 2, 1987, Ser. No. 69,137

Claims priority, application United Kingdom, Jul. 8, 1986, 8616614

Int. Cl.[4] C12P *7/22;* C12R *1/40*

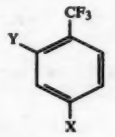
U.S. Cl. 435—155 **5 Claims**

1. A biochemical process for the preparation of a compound of formula (IV)



(IV)

from a compound of formula (V):



(V)

where each of X and Y independently is hydrogen or fluorine, comprising culturing a microorganism selected from *P. putida* NCIB 12190 and mutants thereof, supplying a compound of formula (V) to the culture in a suitable medium and subsequently recovering a compound of formula (IV) therefrom.

4,877,733

GLUCOSE DEHYDROGENASE AND ITS PRODUCTION

Mamoru Takahashi; Shigeyuki Imamura, and Masaki Takada, all of Shizuoka, Japan, assignors to Toyo Jozo Kabushiki Kaisha, Shizuoka, Japan

Filed Apr. 28, 1987, Ser. No. 42,655

Claims priority, application Japan, May 2, 1986, 61-101183; Mar. 16, 1987, 62-58874

Int. Cl.[4] C12N *9/04*

U.S. Cl. 435—190 **3 Claims**

1. Glucose dehydrogenase having the following biochemical properties:

(a) enzymatic action: catalyzes a reaction which generates glucono-δ-lactone and reduced NADP from glucose and NADP; and

(b) substrate specificity: has substrate specificity on glucose and no substrate specificity on 2-deoxyglucose.

4,877,734

MICROBIOLOGICALLY PRODUCED α-ACETYLAMINO CINNAMIC ACID ACYLASE, METHOD OF ITS PRODUCTION AND ITS USE

Maria-Regina Kula, Niederziehr-Hambach; Werner Hummel, Titz; Horst Schütte, Salzgitter, and Wolfgang Leuchtenberger, Bruchkobel, all of Fed. Rep. of Germany, assignors to Degussa Aktiengesellschaft and Gesellschaft für biotechnologische Forschung-mit beschränkter Haftung GBF, Frankfurt am Main, Fed. Rep. of Germany

Filed Jun. 26, 1987, Ser. No. 66,492

Claims priority, application Fed. Rep. of Germany, Jun. 28, 1986, 3621839

Int. Cl.[4] C12N *9/80, 9/78, 9/02;* C12P *13/22*

U.S. Cl. 435—228 **5 Claims**

1. A microbiologically produced α-acetylamino cinnamic acid acylase having the following properties:

(i) reactivity:
said acylase reacts with α-acetylamino cinnamic acid with the formation of α-imino-β-phenylpropionic acid or phenylpyruvic acid;

(ii) substrate specificity:
said acylase hydrolyzes α-acetylamino cinnamic acid but not acetylamino acrylic acid nor N-acetylphenylalanine;

(iii) optimum pH:
said acylase has a pH optimum of 7.5±1;

(iv) pH stability:
said acylase is stable between pH 6.9 and pH 9.4;

(v) optimum temperature:
said acylase has a temperature optimum of 52° C. at a pH of 7.5;

(vi) temperature resistance:
said acylase retains 80% of its activity after a 30-minute incubation at 55° C.;

(vii) influences of inhibitors and activators:
mercury compounds, $CdCl_2$ and o-phenanthroline exhibit

an inhibitory effect on said acylase, and dithiothreitol activates said acylase;

(viii) molecular weight;

said acylase has a molecular weight of 50,000±5,000 Daltons;

(ix) subunits:

said acylase consists of 2 subunits each having a molecular weight of 26,000±3,000 Daltons; and

(x) K_M value:

said acylase has a K_M for α-acetylamino cinnamic acid of 0.45 mmoles at pH 7.5.

4,877,735

PROCESS FOR PRODUCING 2-KETO-L-GULONIC ACID

Ikuo Nogami, Nagaokakyo; Takamasa Yamaguchi, Kobe; Masahide Oka, Kawanishi, and Hideo Shirafuji, Nagaokakyo, all of Japan, assignors to Takeda Chemical Industries, Ltd., Osaka, Japan

Filed Jun. 8, 1988, Ser. No. 204,529

Claims priority, application Japan, Jun. 19, 1987, 62-154100

Int. Cl.[4] C12P *7/60, 7/58;* C12R *1/01*

U.S. Cl. 435—138 **7 Claims**

1. A process for producing 2-keto-L-gulonic acid which comprises culturing a microorganism belonging to the genus *Pseudogluconobacter* which has an ability to oxidize L-sorbose to 2-keto-L-gulonic acid in a culture medium supplemented with a rare earth element in the presence of L-sorbose.

4,877,736

AEROBIC MICROORGANISM FOR THE DEGRADATION OF CHLORINATED ALIPHATIC HYDROCARBONS

Carl B. Fliermans, Augusta, Ga., assignor to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Oct. 12, 1988, Ser. No. 256,429

Int. Cl.[4] C12N *9/00*

U.S. Cl. 435—183 **18 Claims**

1. A biologically pure culture of a microorganism having the identifying characteristics of a representive strain selected from the group consisting of *Welchia alkenophila* sero 5 of ATCC 53570 and *Welchia alkenophila* sero 33 of ATCC 53571.

4,877,737

ATTENUATED PSEUDORABIES VIRUS WHICH HAS A DELETION IN AT LEAST A PORTION OF A REPEAT SEQUENCE AND VACCINE CONTAINING SAME

Meng-Fu Shih, San Diego; Mark D. Cochran, La Jolla, and Richard D. Macdonald, San Diego, all of Calif., assignors to PruTech Research and Development Partnership, San Jose, Calif.

Filed Sep. 6, 1985, Ser. No. 773,430

Int. Cl.[4] C12N *7/00*

U.S. Cl. 435—235 **13 Claims**

1. An attenuated pseudorabies virus designated S-PRV-001 and deposited under ATCC Accession No. VR 2106.

4,877,738

BIOLOGICAL CONTROL OF DAMPING OFF AND ROOT ROT AND INOCULUM PREPARATION THEREFOR

Jo Handelsman, Madison; Ellen H. Mester, Oregon, and Lynn Wunderlich, Appleton, all of Wis., assignors to Wisconsin Alumni Research Foundation, Madison, Wis.

Filed Jul. 25, 1986, Ser. No. 890,402

Int. Cl.[4] C12R *1/07, 1/125*

U.S. Cl. 435—252.5 **5 Claims**

1. A biologically pure culture of *Bacillus cereus* having the identifying characteristics of ATCC 53522.

4. A seed inoculum for application to seeds to be protected from damping off fungal plant disease comprising a carrier and an effective quantity of protecting bacteria selected from the group of bacteria consisting of *Bacillus cereus* ATCC 53522, a mutant of *Bacillus cereus* ATCC 53522 retaining the capability to produce a plant protecting toxin effective against *Phytophthora megasperma,* a mixture of such mutants, and a mixture of *Bacillus cereus* ATCC 53522 and such mutants, the inoculum being substantially soil-free.

4,877,739

ANTIAMMONIA AZOTOBACTER AND THE USE THEREOF

Zhen H. Yang, No. 101 Hu Dong Road, Fu Zhou City, Fu Jian Province, China

Division of Ser. No. 913,431, Sep. 30, 1986, abandoned. This application Sep. 30, 1988, Ser. No. 252,578

Claims priority, application China, Apr. 8, 1986, 86100490

Int. Cl.[4] C12N *1/20*

U.S. Cl. 435—252.1 **14 Claims**

1. A group of autogenic azotobacters mutated from Azotobacter vinelandii, having the capability of antiammonia nitrofixation, wherein said azotobacters fix atmospheric nitrogen and maintain azotase activity in a culture medium containing nitrogen and ammonium sulfate.

4,877,740

PRODUCTION OF CELLS

Stephen C. Taylor, Darlington, England, assignor to Imperial Chemical Industries plc, London, England

Filed Jun. 9, 1987, Ser. No. 60,071

Claims priority, application United Kingdom, Jun. 19, 1986, 8614925

Int. Cl.[4] C12R *1/38*

U.S. Cl. 435—253.3 **6 Claims**

1. A method for the production of cells of *Pseudomonas putida* having an enzyme capable of converting an aromatic or substituted aromatic compound to a corresponding cyclic dihydroxy compound containing a 1,2-dihydroxy-cyclohexa-3,5-diene ring which comprises growing cells of a mutant strain of *Pseudomonas putida* selected from the group consisting of NCIB 11680, NCIB 11767, strains derived from NCIB 11680 and strains derived from NCIB 11767 in a culture medium containing an inducer compound selected from the group consisting of cyclohexane, cyclohexanol, benzene-cis-glycol, furan, thiophene, benzofuran, cyclohexadiene, coumarin, 1,3,5-trimethylbenzene, pyridine and substituted pyridine which causes induction of the enzyme capable of converting the aromatic or substituted aromatic compound to the corresponding cyclic dihydroxy compound and which is not itself a substrate for said enzyme.

4,877,741

TREATMENT OF HUMAN PLASMA WITH BROWN RECLUSE SPIDER TOXIN TO EMULATE A LUPUS ANTICOAGULANT

James L. Babcock, and David L. McGlasson, both of San Antonio, Tex., assignors to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Oct. 24, 1988, Ser. No. 261,302

Int. Cl.[4] G01N *31/00*

U.S. Cl. 436—8 **6 Claims**

1. A method for preparing, storing and reconsituting for later use blood plasma treated with brown recluse spider toxin comprising the steps of:

(a) freezing blood plasma treated with brown recluse spider toxin to about −70° C.;

(b) lyopholizing the frozen treated blood plasma;

(c) storing the lyopholized treated blood plasma at freezer temperatures about −70° C.; and,

(d) reconstituting the treated blood with distilled water for use as a positive control for blood tests for the presence of lupus anticoagulants and for blood factor deficiencies.

4,877,742
PREGNANCY TEST WITH EPF

Friedrich E. Maly, Bern; Alain L. de Week, Fribourg, and David Henderson, Berlin, all of Fed. Rep. of Germany, assignors to Schering Aktiengesellschaft, Berlin and Bergkamen, Fed. Rep. of Germany

Filed Jan. 29, 1987, Ser. No. 8,239

Claims priority, application Fed. Rep. of Germany, Jan. 30, 1986, 3603053

Int. Cl.[4] G01N *33/48*

U.S. Cl. 436—65 **16 Claims**

1. A method for early detection of a pregnancy in a female mammal, which does not have a gonadal tumor, comprising determining EPF by measuring its effect on the formation of electronically excited states or free radicals by mononuclear cells or a cell line in a test sample of the female mammal's blood or urine wherein said formation is caused by a treatment effective to form said states or radicals, and comparing said effect to the effect on said formation of a control sample comprising corresponding material from at least one nonpregnant female, which does not have a gonadal tumor, of the same mammalian species, wherein a statistically significant difference between the effect of the test sample compared to the effect of the control sample indicates pregnancy.

4,877,743
MONITORING REACTION OF NITROUS OXIDE TO FORM NITROGEN

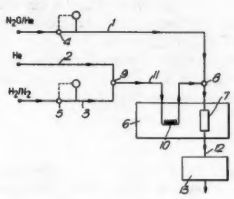
Kenneth C. Waugh, Mere, and Godfrey C. Chinchen, Cleveland, both of England, assignors to Imperial Chemical Industries PLC, London, United Kingdom

Continuation of Ser. No. 863,028, May 14, 1986, abandoned. This application Mar. 31, 1988, Ser. No. 177,887

Claims priority, application United Kingdom, May 20, 1985, 8512684

Int. Cl.[4] G01N *33/00*; **C01B** *21/00*

U.S. Cl. 436—116 **10 Claims**



1. A method of monitoring the reaction between nitrous oxide and a material containing at least one reactive constituent selected from the group consisting of a metal and a metal oxide, said reactive constituent being reactive with nitrous oxide to form nitrogen, comprising

(i) commencing, and thereafter continuing, flow of a mixture of nitrous oxide and an inert diluent, other than nitrogen, of a known and constant composition, through a bed of the material at a known rate, so that all of said mixture passes through the bed,

the proportion of nitrous oxide in said mixture, and the rate of flow thereof, in relation to the amount of said material, being such that for a period of time all the nitrous oxide in the mixture reacts with the material so that there is nitrogen, but not nitrous oxide, in the exit gas leaving the bed, and

(ii) determining the time interval between

(a) the onset of the appearance of nitrogen in the exit gas and

(b) the onset of the appearance of nitrous oxide, or the time at which there is a rapid fall in nitrogen content, in the exit gas.

4,877,744
QUALITATIVE METABOLISM ASSESSMENT USING HIGH PERFORMANCE THIN LAYER CHROMATOGRAPHY

Shih-Ling Chang, Lexington, Ky., assignor to The University of Kentucky Research Foundation, Lexington, Ky.

Filed Jul. 27, 1987, Ser. No. 77,924

Int. Cl.[4] G01N *30/90*

U.S. Cl. 436—162 **8 Claims**

1. In a method for characterizing the oxidative phenotype of a subject comprising collecting a fluid sample from the subject, analyzing the sample to quantitatively determine the presence of oxidative metabolites of a drug and comparing the results obtained for the subject with those obtained for a normal subject subsequent to the administration of said drug, the improvement wherein

the analyzing step is rapidly conducted by high performance thin layer chromatography to qualitatively assess the metabolite pattern of the subject; and

the comparing step is conducted by visually comparing the subject's metabolite pattern to a normal subject's metabolite pattern.

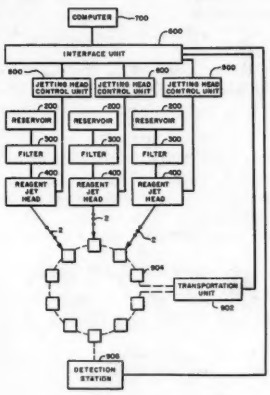
4,877,745
APPARATUS AND PROCESS FOR REAGENT FLUID DISPENSING AND PRINTING

Donald J. Hayes, Plano; David B. Wallace, Dallas, both of Tex.; Donald J. Verlee, Libertyville, Ill., and Kenneth R. Houseman, Racine, Wis., assignors to Abbott Laboratories, Abbott Park, Ill.

Continuation of Ser. No. 931,476, Nov. 17, 1986, abandoned. This application Mar. 14, 1989, Ser. No. 325,037

Int. Cl.[4] G01D *9/00, 15/16*; **G01N** *1/10, 21/75*

U.S. Cl. 436—166 **18 Claims**



1. A diagnostic analyzing system comprising:

means for positioning and containing at least one of (1) a diagnostic reagent fluid and (2) a sample; and

means for precisely metering and dispensing the other one of the (1) diagnostic reagent fluid and (2) sample to interact with the positioned one of the (1) diagnostic reagent fluid and (2) sample, the metering and dispensing means comprising:

a jetting chamber defining a volume and comprising a first and second aperture, the first aperture adapted to receive the other one of the (1) diagnostic reagent fluid and (2) sample, the second aperture defining an orifice;

a transducer in mechanical communication with the jetting chamber, the transducer operative to alternately expand and de-expand the volume of the jetting chamber in re-

sponse to a selected electrical pulse and thereby cause the jetting chamber to propel a reproducibly sized droplet of the other one of the (1) diagnostic reagent fluid and (2) sample from the orifice;

means for generating a number of electrical pulses sufficient to cause a precise quantity of the other one of the (1) diagnostic reagent fluid and (2) sample to be dispensed; and

means for detecting reaction results produced by the interaction of the diagnostic reagent fluid and sample.

4,877,746

METHODS OF CARRYING OUT ASSAYS FOR LIPOPROTEINS AND APOLIPOPROTEINS

Gunnel B. Jansson, Alunda, and Erling S. Holmlund, Vattholma, both of Sweden, assignors to Pharmacia AB, Upsala, Sweden

PCT No. PCT/SE86/00405, § 371 Date Apr. 21, 1987, § 102(e) Date Apr. 21, 1987, PCT Pub. No. WO87/02137, PCT Pub. Date Apr. 9, 1987

PCT Filed Sep. 12, 1986, Ser. No. 49,997

Claims priority, application Sweden, Sep. 27, 1985, 8504466

Int. Cl.[4] G01N *33/53*

U.S. Cl. 436—518 **4 Claims**

1. A method for carrying out immunochemical assays for the lipoprotein, Lp(a), and/or the apolipoprotein, apo(a), which comprises

(a) subjecting a sample suspected for containing Lp(a) and/or apo(a) to an environment where the pH is above about 9.0 or below about 3.0, for a time between 5 minutes and 20 hours, without causing denaturation of said Lp(a) or apo(a),

(b) adjusting the pH of the mixture resulting from step (a) to a value suitable for an immune reaction between Lp(a) or apo(a) and anti-apo(a) antibodies,

(c) reacting the mixture resulting from step (b) with anti-apo(a) antibodies.

(d) measuring the amount of immune complexes formed in step (c), and

(e) relating the measurement of step (d) to the amount of Lp(a) and/or apo(a) in said sample.

4,877,747

OPTICAL ASSAY: METHOD AND APPARATUS

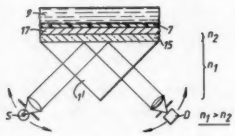
William J. Stewart, Blakesley, Northants, England, assignor to Plessey Overseas Limited, Ilford, United Kingdom

Filed Apr. 4, 1986, Ser. No. 848,679

Claims priority, application United Kingdom, Apr. 12, 1985, 8509492

Int. Cl.[4] G01N *21/77, 33/553*

U.S. Cl. 436—525 **12 Claims**



1. An optical assay method comprising the following steps:

providing a coated metallic medium, the coating thereof being sensitized for a specific assay species; generating in the metallic medium a resonant signal at optical frequency, the power of this signal extending into the sensitized coating;

providing coupling between said resonant signal and a monitored optical beam; exposing the coated metallic medium to a fluid assay sample; and,

measuring any changes in the optical beam to detect a response to the presence of the specific assay species in the fluid sample.

4,877,748

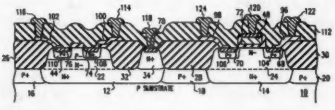
BIPOLAR PROCESS FOR FORMING SHALLOW NPN EMITTERS

Robert H. Havemann, Garland, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.

Division of Ser. No. 45,978, May 1, 1987, Pat. No. 4,816,423. This application Jan. 24, 1989, Ser. No. 301,220

Int. Cl.[4] H01L *21/74, 21/265*

U.S. Cl. 437—31 **6 Claims**



1. A method for forming a bipolar device, comprising:

providing a substrate of a first conductivity type;

forming a bipolar region having an intrinsic base at the first conductivity type and a buried collector of a second conductivity type and connected to the surface of the silicon with a deep collector of a second conductivity type;

forming a layer of oxide in the bipolar region over the intrinsic base region with an emitter opening and a base opening exposing the underlying surface of the substrate and separated by a portion of the oxide layer;

forming a layer of refractory metal over the substrate and contacting the exposed silicon surfaces;

reacting the refractory metal to form a silicide with the exposed silicon surfaces;

selectively implanting impurities of the first conductivity type into the silicide formed in the emitter opening;

selectively implanting impurities of the second conductivity type into the silicide formed in the emitter opening;

removing the portions of the refractory metal layer not reacted to form silicide; and

driving the impurities implanted into the silicide downward from the silicide into the underlying silicon to form a metallurgical junction below the silicide layer.

4,877,749

METHOD OF FORMING A LOW LOSS FET

Fred L. Quigg, Thousand Oaks, Calif., assignor to Polyfet Re Devices, Inc., Newbury Park, Calif.

Division of Ser. No. 834,610, Feb. 28, 1986, abandoned. This application Sep. 30, 1988, Ser. No. 252,232

Int. Cl.[4] H01L *21/22*

U.S. Cl. 437—41 **7 Claims**

1. A method of forming a self-aligned, low loss field effect transistor (FET), comprising:

establishing a doped semiconductive substrate of a first polarity with a doped semiconductive body region of opposite polarity set in the substrate and characterized by a raised area and a lateral recessed area, a layer of gate insulative material over the raised area and extending above the recessed area, a gate member on the opposite side of the gate insulative layer from the body region, and a layer of doped semiconductive material of the same relative polarity as the substrate, the doped layer being spaced from the gate member by a lateral portion of the gate insulative layer and extending over the recessed area and under the gate insulative layer to the raised area,

substantially removing the doped layer lateral to the gate insulative layer,

coating the substrate with a refractory metal,

treating the refractory metal coating so that an adherent conductive layer is formed with the underlying gate

member, doped layer and recessed area, but not with the underlying gate insulative layer,

removing the refractory metal coating from the gate insulative layer, the conductive layer overlying the recessed area providing a direct metal contact with the body region and doped layer, the conductive layer overlying the gate member providing a direct metal contact with the gate member, the lateral portion of the gate insulative layer electrically insulating the doped layer from the gate member, and

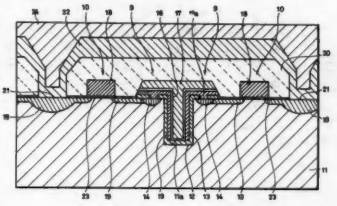
connecting a gate connection to the conductive layer overlying the gate member, a source connection to the conductive layer overlying the recessed area, and a drain connection at a drain location.

4,877,750

METHOD OF FABRICATING A TRENCH CAPACITOR CELL FOR A SEMICONDUCTOR MEMORY DEVICE

Yoshinori Okumura, Hyogo, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Oct. 7, 1988, Ser. No. 254,836
Claims priority, application Japan, Nov. 17, 1987, 62-291349
Int. Cl.[4] H01L *21/306*
U.S. Cl. 437—47 **7 Claims**



1. A method of fabricating a trench capacitor cell for a semiconductor device comprising the steps of:

forming a trench in a semiconductor substrate;

forming a first insulating layer and a first conductor layer successively on the side and bottom walls of said trench;

filling said trench with a second insulating layer;

coating the surface of said substrate with a layer of mask made of a material that can be removed by subsequent etching procedure for removing said first conductor layer;

selectively removing the part of said mask lying over said second insulating layer;

removing said second insulating layer out of said trench;

selectively removing the part of said first conductor layer lying on the bottom of said trench and said mask by etching procedure; and

filling said trench successively with a third insulating layer and a second conductor layer.

4,877,751

METHOD OF FORMING AN N+ POLY-TO- N+ SILICON CAPACITOR STRUCTURE UTILIZING A DEEP PHOSPHOROUS IMPLANT

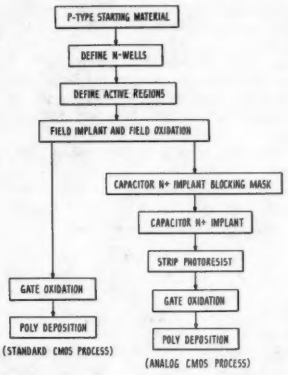
Chih-Sieh Teng; Tian-I Liou, both of San Jose, and Hiekyung Chun-Min, Los Altos, all of Calif., assignors to National Semiconductor Corporation, Santa Clara, Calif.

Filed Mar. 11, 1988, Ser. No. 166,973
Int. Cl.[4] H01L *21/94*
U.S. Cl. 437—47 **24 Claims**

1. In a process for fabricating an integrated circuit device structure on a substrate of semiconductor material having a first conductivity type, the improvement comprising:

modifying a first region of the substrate by introducing an impurity thereto such that the first region has a conductivity type opposite to that of the substrate, the impurity having a peak concentration below the surface of the first region so that a layer of dielectric material subsequently grown over the first region has a first preselected thickness;

simultaneously growing a layer of dielectric material over the first region and over a second region of the substrate, the thickness of the dielectric layer grown over the second region differing in thickness from the thickness of the



dielectric layer grown over the first region, the thickness of the dielectric layer over the second region being a second preselected thickness; and

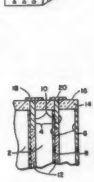
forming a layer of conductive material over the dielectric layer such that a capacitor structure formed by the first region, the layer of dielectric material overlying the first region and the layer of conductive material has a preselected voltage coefficient.

4,877,752

3-D PACKAGING OF FOCAL PLANE ASSEMBLIES

William L. Robinson, El Toro, Calif., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Oct. 31, 1988, Ser. No. 265,107
Int. Cl.[4] H01L *21/302*
U.S. Cl. 437—51 **5 Claims**



1. A method for three-dimensional packaging of a focal plane module assembly, comprising the steps of:

processing a silicon wafer in the customary manner to make electronic dies having dielectric material on a surface;

cutting said wafer into multiple individual dies, said dies each having a front side and a back side and further having said dielectric material on said back side;

bonding a gold ribbon to said front side of each die, using a

suitable micro-joining process, said ribbon having a first end and a second end, so that said first end is attached to said front side of said die away from edges of said die and said second end extends over an edge of said die to form a gold ribbon extension of a suitable length;

stacking and aligning said dies in an alignment mode and compressing said dies together to a preset total thickness to produce a module, said module having a top surface and a bottom surface, said top and bottom surfaces containing said gold ribbon extensions;

back filling spaces between individual dies with epoxy and curing;

depositing and curing dielectric insulation material to a suitable thickness on said top surface of said module;

removing any excess of said gold ribbon extensions and polishing said dielectric insulation material on said top surface;

resisting said top surface and exposing tips of said gold ribbons;

depositing conductive bond pads so that said bond pads are in contact with said tips of said gold ribbons.

4,877,753

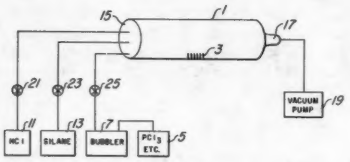
IN SITU DOPED POLYSILICON USING TERTIARY BUTYL PHOSPHINE

Dean W. Freeman, Garland, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.

Continuation of Ser. No. 937,956, Dec. 4, 1986, abandoned. This application Mar. 1, 1988, Ser. No. 165,457

Int. Cl.[4] H01L *21/469*

U.S. Cl. 437—101 **16 Claims**



1. A method of forming a layer of phosphorous doped polysilicon, comprising the steps of:

(a) providing a furnace having a surface therein for deposition of phosphorous doped polysilicon thereon,

(b) evacuating said furnace to a pressure in the range of from about 100 to about 1000 milliTorr.,

(c) heating said furnace to a temperature of from about 610 to about 700 degrees C., and

(d) simultaneously entering a predetermined ratio of silane and gaseous tertiary butyl phosphine into said furnace to form a layer of uniformly phosphorous doped polysilicon on said surface.

4,877,754

METHOD OF MANUFACTURING SEMICONDUCTOR DEVICE

Hermanus L. Peek, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

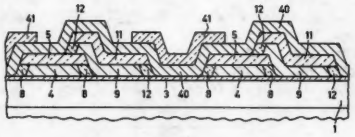
Division of Ser. No. 507,409, Jun. 24, 1983, Pat. No. 4,763,185. This application Mar. 31, 1988, Ser. No. 173,003

Claims priority, application Netherlands, Jul. 9, 1982, 8202777

Int. Cl.[4] H01L *21/00, 21/02, 21/283, 21/31*

U.S. Cl. 437—195 **9 Claims**

1. A method of manufacturing a semiconductor device on a surface of a semiconductor body provided with a first insulating layer, the method comprising the steps of: (a) providing a layer of conducting material and a second insulating layer on the surface, (b) forming a pattern of insulating strips in the second insulating layer, (c) using the pattern as a mask while etching a corresponding pattern of conductor strips in the layer of conducting material, (d) underetching the corresponding pattern so that the conductor strips exhibit exposed sides which are located under edges of the insulating strips, (e) providing the exposed sides with insulating tracks,



characterized in that the insulating tracks are provided by depositing on the assembly a third insulating layer, which fills spaces located under the edges of the insulating strips, and in that at least a part of the third insulating layer is etched selectively with respect to the first insulating layer, until parts of the first insulating layer adjacent the insulation strips are exposed again.

4,877,755

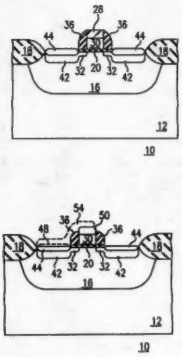
METHOD OF FORMING SILICIDES HAVING DIFFERENT THICKNESSES

Mark S. Rodder, Dallas, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.

Filed May 31, 1988, Ser. No. 200,394

Int. Cl.[4] H01L *21/283*

U.S. Cl. 437—200 **18 Claims**



1. A method of manufacturing a semiconductor device in a silicon substrate having semiconducting surface areas thereon, said method comprising the steps of:

forming a silicon gate region overlying a portion of one of said surface areas;

forming a first silicide barrier layer overlying said gate region;

forming a first silicide layer in said substrate at said one surface area along a side of said gate region, said first silicide barrier layer preventing silicide from forming on said gate region;

forming a second silicide barrier layer overlying said first silicide layer, said second silicide barrier layer substantially preventing said first silicide layer from expanding; and

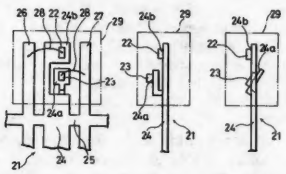
forming a second silicide layer on said gate region with said second silicide barrier layer in place.

4,877,756

METHOD OF PACKAGING A SEMICONDUCTOR LASER AND PHOTOSENSITIVE SEMICONDUCTOR DEVICE

Isamu Yamamoto, and Jiro Fukushima, both of Itami, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Japan

Filed Mar. 30, 1988, Ser. No. 175,356
Claims priority, application Japan, Mar. 31, 1987, 62-79935
Int. Cl.[4] H01L *21/56*
U.S. Cl. 437—209 **9 Claims**



1. A method of packaging a semiconductor laser and photosensitive semiconductor device together comprising:

producing a lead frame having a central lead which is used as a die pad at spaced apart first and second regions for a semiconductor laser and a photosensitive semiconductor device, respectively, and first and second outside leads spaced from said central lead and connected by tie bars to said central lead;

mounting the semiconductor laser and the photosensitive device on the respective first and second regions of said central lead of said lead frame;

bending the first region of said central lead relative to the second region of said central lead so that the first and second regions do not lie in the same plane;

electrically connecting the semiconductor laser and the photosensitive device to the respective first and second outside leads with wires;

sealing said laser and photosensitive device and portions of said leads and the wires in a transparent package; and

cutting said tie bars to electrically disconnect said first and second outside leads from said central lead.

4,877,757

METHOD OF SEQUENTIAL CLEANING AND PASSIVATING A GAAS SUBSTRATE USING REMOTE OXYGEN PLASMA

Rudy L. York, Plano; Joseph D. Luttmer, Richardson; Patricia B. Smith, Euless, and Cecil J. Davis, Greenville, all of Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.

Continuation of Ser. No. 74,386, Jul. 16, 1987, abandoned. This application Dec. 7, 1988, Ser. No. 282,927
Int. Cl.[4] H01L *21/205*
U.S. Cl. 437—235 **10 Claims**

1. A method for sequential cleaning and passivating a mercury-cadmium-telluride wafer with sulfide in a single process chamber, comprising:

(a) disposing said wafer in a process chamber within a process module at low pressure;

(b) generating a remote plasma from oxygen gas; and

(c) introducing the remote plasma within said chamber and to the face of the wafer for an appropriate time period;

(d) introducing a sulfide gas into the chamber and to the face of the wafer for an appropriate time period; and

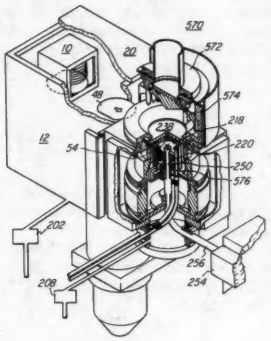
(e) illuminating said sulfide gas within said chamber with additional Ultraviolet light produced within said module.

4. A method for passivating a mercury-cadmium-telluride wafer with selenide comprising:

(a) disposing a wafer in a process chamber within a process module at low pressure;

(b) generating a remote plasma from oxygen gas;

(c) introducing the remote plasma into said chamber and to the face of the wafer for an appropriate time period;



(d) introducing a selenide gas within the chamber and to the face of the wafer for an appropriate time period; and

(e) illuminating said selenide gas within said chamber with additional Ultraviolet light produced within said module.

4,877,758

LEAD-FREE FRIT

Paul R. Lee, Hilliard, and Joseph P. Hingsbergen, Delaware, both of Ohio, assignors to Chi-Vit Corporation, Urbana, Ohio

Filed Dec. 22, 1988, Ser. No. 288,783
Int. Cl.[4] C03C *8/08, 8/04, 3/097, 3/068*
U.S. Cl. 501—24 **5 Claims**

1. A lead-free frit suitable for use on aluminum and its alloys, said frit consisting essentially of about:

33–42 wt. %	SiO_2
8–13	TiO_2
0.5–2.5	SnO_2
0.5–2.5	BaO
2.5–5.0 in the absence of Ce_2O_3; 0–4.5% if Ce_2O_3 is present.	SrO
2.2–4.3	ZnO
13–26	Na_2O
4–9	K_2O
0.7–6.0	Li_2O
0.5–4.5	B_2O_3
1.0–3.5	Sb_2O_3
0–0.8	Ce_2O_3
0.5–5.0	P_2O_5
0.2–1.0	MoO_3

said frit having a fusion temperature below about 1050° F.

4,877,759

ONE STEP PROCESS FOR PRODUCING DENSE ALUMINUM NITRIDE AND COMPOSITES THEREOF

J. Birch Holt, San Jose; Donald D. Kingman, Danville, and Gregory M. Bianchini, Livermore, all of Calif., assignors to Regents of the University of California, Oakland, Calif.

Filed May 29, 1987, Ser. No. 55,475
Int. Cl.[4] C04B *35/58;* C01B *21/072*
U.S. Cl. 501—96 **11 Claims**

1. A combustion synthesis method for producing dense aluminum nitride comprising igniting aluminum powder in a nitrogen atmosphere at a pressure of about 1000 atmospheres.

2. A method for the synthesis of dense aluminum nitride or cermets or composites thereof comprising the steps of:
pouring aluminum powder into a suitable container;
placing an igniter pellet on top of said container;
loading said container into a high pressure autoclave;
pressurizing said autoclave with nitrogen gas to a preselected pressure;
igniting said aluminum powder by igniting said pellet;
allowing the combustion to proceed to completion; and
removing the aluminum nitride or aluminum nitride cermet formed in said container.

4,877,760

ALUMINUM NITRIDE SINTERED BODY WITH HIGH THERMAL CONDUCTIVITY AND PROCESS FOR PRODUCING SAME

Akiyasu Okuno, Kani; Masakazu Watanabe, Nagoya, and Kazuhiko Ikoma, Komaki, all of Japan, assignors to NGK Spark Plug Co., Ltd., Aichi, Japan

Continuation-in-part of Ser. No. 864,879, May 20, 1986, abandoned. This application Apr. 17, 1987, Ser. No. 39,347
Claims priority, application Japan, May 22, 1985, 60-111113; May 24, 1985, 60-112330
Int. Cl.[4] C04B 35/58
U.S. Cl. 501—98 35 Claims

4. An aluminum nitride-base sintered body with high thermal conductivity, excellent wettability to metal and a specific resistivity of at least 10^9 ohm-cm which:
(a) consists essentially of:
100 parts by weight of aluminum nitride and 0.1–10 parts by weight, of at least two components selected from the group consisting of metal borides and metal carbides, the borides being of elements of Groups 4a (Ti, Zr, Hf), 5a (V, Nb and Ta) and 6a (Cr, Mo, W) of the International Periodic Table, and the carbides being of elements of said Groups 4a, 5a and 6a, wherein at least one of said components is any one of said borides and at least one of said components is any one of the carbides, calculated as the metal of said at least two components and
(b) has a mean crystal grain size not exceeding 10 μm.

5. An aluminum nitride-base sintered body with high thermal conductivity, excellent wettability to metal and a specific resistivity of at least 10^9 ohm-cm which consists essentially of:
100 parts by weight of aluminum nitride and 0.1–10 parts by weight, of at least two components selected from the group consisting of metal nitrides and metal carbides, the nitrides being of elements of Groups 4a (Ti, Zr, Hf) and 5a (V, Nb and Ta) of the International Periodic Table, and the carbides being of elements of said Groups 4a, 5a and Group 6a (Cr, Mo, W) of said International Periodic Table, calculated as the metal of said at least two components wherein at least one of said components is any one of said nitrides and at least one of said components is any one of the carbides.

4,877,761

REFRACTORY COMPOSITION FOR REFRACTORY LININGS OF METALLURGICAL VESSELS

Max Chmiel, and Rainer Prange, both of Hagen, Fed. Rep. of Germany, assignors to Dolomitwerke GmbH, Wulfrath, Fed. Rep. of Germany

Continuation-in-part of Ser. No. 64,817, Jun. 19, 1987, abandoned. This application Apr. 11, 1989, Ser. No. 338,385
Claims priority, application Fed. Rep. of Germany, Jun. 19, 1986, 3620473
Int. Cl.[4] C04B 35/04, 35/06
U.S. Cl. 501—109 10 Claims

1. A refractory composition for a refractory lining of a metallurgical vessel, consisting essentially of:
sintered oxide granulations based on a member selected from the group consisting of magnesium oxide, dolomite, calcium oxide and a combination thereof;
an organic binder consisting essentially of 0.5 to 10% by weight of a mixture selected from the group consisting of carbomethoxy-substituted oligophenyls, carbomethoxy-substituted benzyl esters and a combination thereof which are produced as a residue in the production of dimethylterephthalate; and
0 to 20 parts by weight of a fine particulate carbon carrier per 100 parts by weight sintered oxide.

4,877,762

CATALYST FOR SIMULTANEOUS HYDROTREATING AND HYDRODEWAXING OF HYDROCARBONS

John W. Ward, Yorba Linda, Calif., and Timothy L. Carlson, Grand Junction, Colo., assignors to Union Oil Company of California, Los Angeles, Calif.

Division of Ser. No. 267,247, May 26, 1981, Pat. No. 4,428,862, which is a continuation-in-part of Ser. No. 172,868, Jul. 28, 1980, abandoned. This application Aug. 22, 1988, Ser. No. 234,804
The portion of the term of this patent subsequent to Jan. 31, 2001, has been disclaimed.
Int. Cl.[4] B01J 29/28, 29/34
U.S. Cl. 502—77 54 Claims

46. A catalyst composition useful for simultaneous dewaxing, denitrogenation and desulfurization of hydrocarbons by reaction with hydrogen consisting essentially of between about 1 and about 5 percent by weight of nickel components, calculated as NiO, and between about 15 and 30 percent by weight of tungsten components, calculated as WO_3, on a support consisting essentially of a porous refractory oxide in admixture with between about 70 and 90 percent by weight of the support of an organic-free silicalite having a specific gravity at 25° C. of 1.70±0.5 g./cc., a mean refractive index of 1.39±0.01, and an X-ray diffraction pattern whose six strongest lines are as set forth in the following table, wherein S refers to strong lines and VS to very strong lines:

d-A	Relative Intensity
11.1 ± 0.2	VS
10.0 ± 0.2	VS
3.85 ± 0.07	VS
3.82 ± 0.07	S
3.76 ± 0.05	S
3.72 ± 0.05	S

and wherein both of said metal components are in part supported on said refractory oxide and in part on said silicalite.

4,877,763

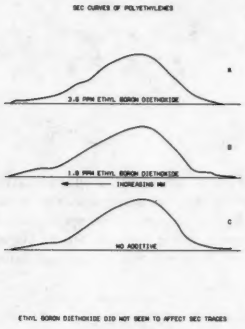
SUPPORTED CHROMIUM OXIDE/BORON CATALYST

Max P. McDaniel, and James N. Short, both of Bartlesville, Okla., assignors to Williams, Phillips & Umphlett, Bartlesville, Okla.

Division of Ser. No. 38,386, Apr. 15, 1987, Pat. No. 4,818,800, which is a continuation-in-part of Ser. No. 759,984, Jul. 29, 1985, abandoned, which is a division of Ser. No. 613,938, May 25, 1984, abandoned. This application Oct. 3, 1988, Ser. No. 252,310
Int. Cl.[4] C08F 2/14, 4/18, 10/02
U.S. Cl. 502—117 15 Claims

1. A catalyst and boron-component system consisting essentially of effective ratios of:
(a) a supported chromium oxide catalyst wherein said support is a silica-containing support selected from at least one of the group consisting of silica, silica-alumina, coprecipitated silica-titania, coprecipitated silica-alumina-titania, and mixtures, wherein at least a portion of said chromium is hexavalent, and said catalyst (a) contains about 0.1 to 10 percent by weight chromium; and
a boron-component selected from the group consisting of (b) and (b)+(c), employing said boron-component in an amount sufficient to give an atom ratio of boron to chromium within the range of about 0.3:1 to 10:1;
wherein said (b) is a dihydrocarbylboron monohydrocar-

byloxide adjuvant R_2BOR and (c) is a trihydrocarbylborane coadjuvant represented BR_3, wherein each R is


SEC CURVES OF POLYETHYLENES
3.6 PPM ETHYL BORON DIETHOXIDE
1.8 PPM ETHYL BORON DIETHOXIDE
INCREASING MW
NO ADDITIVE
ETHYL BORON DIETHOXIDE DID NOT SEEM TO AFFECT SEC TRACES

independently selected from C_1 to C_{15} hydrocarbyl radicals; and said (b)+(c) employs a ratio of $R_2BOR:BR_3$ of about 1:4 to 4:1.

4,877,764

CATALYST SYSTEM FOR AMMOXIDATION OF PARAFFINS

Linda C. Glaeser, Lyndhurst; James F. Brazdil, Jr., Mayfield Village, and Mark A. Toft, Lakewood, all of Ohio, assignors to The Standard Oil Company, Cleveland, Ohio

Continuation-in-part of Ser. No. 39,859, Apr. 20, 1982, Pat. No. 4,767,739. This application Jul. 22, 1988, Ser. No. 222,985

The portion of the term of this patent subsequent to Aug. 30, 2005, has been disclaimed.

Int. Cl.[4] B01J *23/18, 23/22, 23/30, 27/198*

U.S. Cl. 502—209 **10 Claims**

1. A catalytic mixture suitable for the ammoxidation of propane to acrylonitrile, which comprises an intimate particulate mixture of a first catalyst composition and a second catalyst composition, said first catalyst composition being 10–99 weight percent of a diluent/support and 90-1 weight percent of a catalyst having the components in the proportions indicated by the empirical formula:

$$VSb_mA_aB_bC_cT_fO_x, \qquad \text{formula (1)}$$

where

A is one or more of W, Sn, Mo, B, P and Ge;

B is one or more of Fe, Co, Ni, Cr, Pb, Mn, Zn, Se, Te, Ga, In and As;

C is one or more of an alkali metal and Tl;

T is one or more of Mg, Ca, Sr, and Ba; and

where m is from 0.01 and up to 20; a is 0.2–10; b is 0–20; c is 0–1; t is 0–20; the ratio $(a+b+c+t):(1+m)$ is 0.01–6; wherein x is determined by the oxidation state of other elements, and wherein the antimony has an average valency higher than +3 and the vanadium has an average valency lower than +5,

said second catalyst composition being 0–99 weight percent of a diluent/support and 100-1 weight percent of a catalyst having the components in the proportions indicated by the empirical formula:

$$Bi_kFe_lMo_{12}D_dE_eF_fG_gO_x \qquad \text{formula (2)}$$

where

D is one or more of an alkali metal, Sm, Ag

E is one or more of Mn, Cr, Cu, V, Zn, Cd, La,

F is one or more of P, As, Sb, Te, W, B, Sn, Pb, Se

G is one or more of Co, Ni, alkaline earth metal, and

k is 0.1–12, l is 0.01–12, d is 0–0.5, e is 0–10,

f is 0–10, g is 0–12, $k+l+d+e+f+g \leqq 24$, and x is a number determined by the valence requirements of the other elements present, and wherein the weight ratio in said mixture of said first catalyst composition to said second catalyst composition is in the range of 0.001 to 2.5.

4,877,765

ADSORPTIVE MATERIAL FOR THE REMOVAL OF CHLOROPHYLL, COLOR BODIES AND PHOSPHOLIPIDS FROM GLYCERIDE OILS

James N. Pryor, West Friendship; James M. Bogdanor, Columbia, and William A. Welsh, Fulton, all of Md., assignors to W. R. Grace & Co., New York, N.Y.

Filed May 15, 1987, Ser. No. 50,998

Int. Cl.[4] B01J *20/10*

U.S. Cl. 502—408 **20 Claims**

1. An acid-treated amorphous silica adsorbent comprising a high surface area amorphous silica on which is supported an inorganic acid, an acid salt or a strong organic acid having a pK_a of about 3.5 or lower, said adsorbent characterized in having an acidity factor of at least about 2.0×10^{-8} and a pH of about 3.0 or lower.

2. The adsorbent of claim 1 in which said amorphous silica is a silica hydrogel, silica xerogel, precipitated silica, fumed silica, dialytic silica or silica alumina.

5. The adsorbent of claim 1 in which said acid is an inorganic acid.

8. The adsorbent of claim 1 in which said acid is a strong organic acid.

4,877,766

MINI-MONOLITH SUBSTRATE

Rodney I. Frost, Corning, N.Y., assignor to Corning Incorporated, Corning, N.Y.

Filed Jul. 18, 1988, Ser. No. 220,543

Int. Cl.[4] B01J *32/00, 35/04*

U.S. Cl. 502—439 **26 Claims**

1. A rigid mini-monolith structure having a longitudinal axis, said structure having a plurality of internal openended cells extending longitudinally from one end of said structure to an opposite end thereof, each of said cells being of uniform transverse cross section throughout its own length, not all of said cells being of the same transverse cross section, all of said cells being of the same hydraulic diameter.

4,877,767

VINYL DEVELOPER RESINS

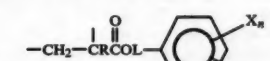
Rong-Chang Liang, Centerville; Karl A. Kintz, Kettering; Joseph G. O'Connor, and Paul C. Adair, both of Springboro, all of Ohio, assignors to The Mead Corporation, Dayton, Ohio

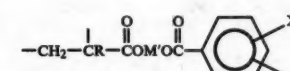
Filed Aug. 14, 1987, Ser. No. 86,059

Int. Cl.[4] B41M *5/16*

U.S. Cl. 503—212 **27 Claims**

1. A developer sheet comprising a support having a layer of a color developer on the surface thereof, said color developer being capable of reacting with a substantially colorless electron donating color former to produce a color image and being a microparticle having a core portion and a shell portion, said core portion being thermoplastic and melting at a lower temperature than said shell portion, said microparticle being formed from a vinyl or acrylic polymer having a repeating unit of formulae (I), (II), or (III)





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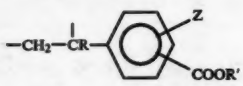


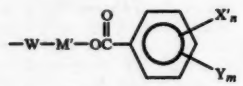
(III)

where

R is a hydrogen atom or a methyl group;

L is a direct bond or a spacer group;

X is —OH, —COOH, —OM, COOR' or a group of the formula (IV):



(IV)

Y is an alkyl group, an aryl group, or an aralkyl group;

X' is —OH, —COOH, —OM, or —COOR';

W is —O— or

Z is —OH or a hydrogen atom;

M is a metal atom;

M' is a divalent metal atom; R' is a hydrogen atom, an alkyl group, or a metal atom as defined for M;

n is 1 or 2 and when n is 2, X or X' may be the same or different;

m is 0, 1, or 2 and when m is 2; Y may be the same or different.

4,877,768

PROCESSES FOR THE PREPARATION OF COPPER OXIDE SUPERCONDUCTORS

Ronald F. Ziolo, Webster, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed Jul. 25, 1988, Ser. No. 223,827

Int. Cl.[4] C01G *3/02*

U.S. Cl. 505—1 **19 Claims**

1. A process for the preparation of copper oxide superconductors which comprises (1) mixing stoichiometric amounts of and grinding yttrium nitrate hydrate, copper nitride, and an oxidizing agent in a suitable solvent; (2) forming a paste thereof; (3) applying the paste to a substrate; (4) heating the substrate with the paste thereon; and (5) therafter cooling.

4,877,769

6,7-(EPITHIO)-3,7-DIMETHYL-1,3-OCTADIENE AND USE THEREOF IN AUGMENTING OR ENHANCING AROMA OF PERFUME COMPOSITIONS, COLOGNES AND PERFURMED ARTICLES

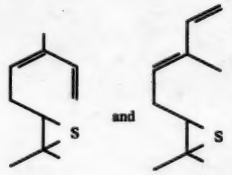
Michael J. Zampino, Roselle Park; Richard A. Wilson, Westfield; Braja D. Mookherjee, Holmdel, all of N.J., and Jean C. Niel, New-Canaan, Conn., assignors to International Flavors & Fragrances Inc., New York, N.Y.

Filed Apr. 28, 1989, Ser. No. 345,015

Int. Cl.[4] A61K *7/46*

U.S. Cl. 512—11 **9 Claims**

1. An 6,7-(epithio)-3,7-dimethyl-1,3-octadiene selected from the group consisting of compounds having the structures:



4. A process for augmenting or enhancing the aroma of a perfume composition, cologne or perfumed article comprising the step of adding to a perfume composition base, a cologne base or a perfumed article base, an aroma augmenting or enhancing quantity of at least one compound defined according to claim 1.

4,877,770

CHEMICAL DERIVATIVES OF GHL-CU

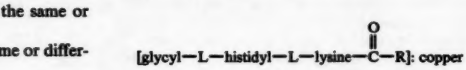
Loren R. Pickart, Bellevue, Wash., assignor to ProCyte Corporation, Redmond, Wash.

Continuation of Ser. No. 40,460, Apr. 20, 1987, abandoned, which is a continuation-in-part of Ser. No. 699,824, Feb. 8, 1985, Pat. No. 4,665,054. This application Feb. 17, 1989, Ser. No. 312,295

Int. Cl.[4] A61K *37/02*; C07K *5/08*

U.S. Cl. 514—18 **9 Claims**

1. Derivatives of GHL-Cu which possess wound-healing activity and having the general formula:



(II)

wherein R is selected from alkoxy moieties containing from 16 to 18 carbon atoms.

4,877,772

ALCOHOLIC BEVERAGE AND PROCESS FOR PRODUCING SAME

Levan A. Mudzhiri, Pavlova, 55, kv. 16.; Gia G. Alkhazashvili, Vazha Pshavela, 55, 2 kvartal, korpus 3, kv.22.; Elena I. Kalatozishvili, Akhmeteli, 7, kv. 17.; Gia O. Chekurishvili, Paliashvili, 36., all of Tbilisi; Izrail I. Brekhman, Admirala Fokina, 27, kv. 4.; Alexandr E. Bulanov, Khabarovskaya, 12, kv. 3., both of Vladivostok, and Mira I. Polozhentseva, 2 Parkovaya, 13, kv. 22., Vladivostok, all of U.S.S.R.

Filed Dec. 3, 1986, Ser. No. 937,630

The portion of the term of this patent subsequent to Feb. 28, 2006, has been disclaimed.

Int. Cl.[4] C12G *1/00*; C12C *11/00*

U.S. Cl. 514—23 **6 Claims**

1. An alcoholic beverage consisting of the following components, per 1,000 decaliters of the beverage:

(1) 473–493 kg of a composition inhibiting the development of a pathological addiction to alcohol and containing the following ingredients, mg/g:

leukoanthocyanes	219–270
catechins	153–187
flavonols	81–99
lignin	68–83
reducing sugars	216–264
pectin	18–22
organic acids	76.5–93.5
sterols	4.5–5.5
methylsterols	1.35–1.65
dimethylsterols	1.98–2.42
lignans	13.5–16.5
lignan glycosides	9–11

-continued

phenolic aldehydes	4.5–5.5
alkylferulates	4.5–5.5

(2) 4,950–5,050 kg of a 40° fruit alcohol,
(3) 95–105 kg of sugar,
(4) 1.8–2.2 kg of citric acid,
(5) 28–32 kg of a tint, and
(6) 4,317.8–4,452.2 kg of an aqueous-alcoholic liquid.

4,877,773

PHARMACEUTICAL PREPARATION

Leola E. B. Turner, Main St., Greensboro, Ga. 30642

Filed Apr. 29, 1987, Ser. No. 43,761
Int. Cl.[4] A61K *33/04, 31/715*
U.S. Cl. 514—23 2 Claims

1. A composition comprising ½ equal part epson salt, 1 equal part molasses syrup, 1 equal part castor oil and ½ equal part amorphous sulfur.

4,877,774

ADMINISTRATION OF STEROID HORMONES

Josef Pitha, Baltimore; Mitchell Harman, Ellicott City, both of Md., and Kaneto Uekama, Kumamoto, Japan, assignors to The United States of America as represented by the Department of Health and Human Services, Washington, D.C.

Filed Sep. 9, 1987, Ser. No. 94,597
Int. Cl.[4] A61K *31/70, 31/56*
U.S. Cl. 514—26 10 Claims

1. A method for administering steroid hormones to a patient needing supplemental steroid hormones by direct contact with mucosa or the conjuctiva comprising contacting the mucosa of said patient needing supplemental steroid hormones with an effective amount of a steroid hormone complexed with crystalline gamma-cyclodextrin.

4,877,775

POLYMERIC AMINOSACCHARIDES AS ANTIHYPERCHOLESTEROLEMIC AGENTS

Angelo G. Scopelianos, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Jun. 16, 1986, Ser. No. 874,478
Int. Cl.[4] A61K *31/70;* C07H *15/20*
U.S. Cl. 514—41 24 Claims

1. A cholesterol reducing agent consisting essentially of a copolymer of a monomeric 2-deoxy-streptamine aminoglycosidic antibiotic with a dialdehyde crosslinked to form a reduced polymer containing —CH_2NH— bonds, said polymer being formed in the presence of an excess of dialdehyde, or a pharmaceutically acceptable salt thereof.

17. A method of treating hypercholesterolemia in a mammal comprising administering orally to the mammal an effective bile acid binding amount of a copolymer of claim 1.

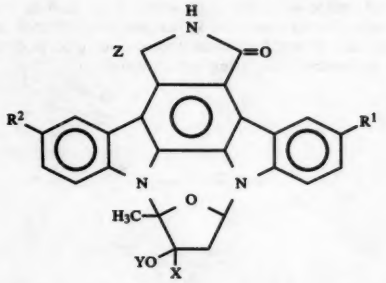
4,877,776

K-252 COMPOUNDS

Chikara Murakata, Asaka; Akira Sato, Machida; Masaji Kasai, Fujisawa; Eiji Kobayashi, Shizuoka; Makoto Morimoto, Shizuoka, and Shiro Akinaga, Shizuoka, all of Japan, assignors to Kyowa Hakko Kogyo Co., Ltd., Tokyo, Japan

Filed Dec. 22, 1988, Ser. No. 288,787
Claims priority, application Japan, Dec. 24, 1987, 62-327857
Int. Cl.[4] A61K *31/71;* C12P *19/38;* C07H *19/04*
U.S. Cl. 514—43 15 Claims

1. A K-252 compound represented by the formula:



wherein R^1 and R^2 are independently H or OH; X represents COOH, COOR or CH_2OH; Y represents H, R or COR; and Z represents OH, OR or SR, wherein R represents lower alkyl.

15. A method for treating diseases due to protein kinase C which comprises administering to a human an effective amount of a pharmaceutical composition comprising a K-252 compound defined in claim 1 and a pharmaceutical carrier.

4,877,777

SOLUBLE PHOSPHORYLATED GLUCAN

Nicholas R. DiLuzio, Gretna, La., assignor to Bioglucans, L. P., New Orleans, La.

Division of Ser. No. 767,388, Aug. 19, 1985, Pat. No. 4,739,016.
This application Apr. 18, 1988, Ser. No. 182,550
Int. Cl.[4] A61K *31/66;* C08B *37/00*
U.S. Cl. 514—54 2 Claims

1. A method for the prevention of leukopenia induced by administration of an anti-cancer agent in animals and humans, comprising: administering to said animal or human a therapeutically effective amount of a soluble phosphorylated glucan, which comprises a phosphorylated poly[β-(1–3)-glucopyranose] chain which is characterized by:

(a) the capability of dissolving in water or an aqueous solution;
(b) being non-toxic, non-immunogenic and substantially non-pyrogenic; and
(c) the capability of exerting a pronounced immunobiological response when administered in vivo to an animal or a human,

in combination with an anti-cancer agent which is an alkylating agent.

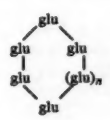
4,877,778

METHOD OF ENHANCING LIPOPHILE TRANSPORT USING CYCLODEXTRIN DERIVATIVES

Thomas O. Carpenter, Orange, Conn., and Josef Pitha, Baltimore, Md., assignors to The Children's Medical Center Corporation, Boston, Mass.

Filed Jul. 1, 1987, Ser. No. 68,921
Int. Cl.[4] A61K *31/715;* C08B *37/16*
U.S. Cl. 514—58 9 Claims

1. A method of treating a mammal to catalytically enhance serum transport of a naturally occurring lipophile present in prolonged excessive concentrations, comprising administering to said mammal a cyclodextrin derivative having the following formula:



where n=1–3, and glu represents a glucose or substituted glucose residue connected in the maner of an amylose chain, each said glucose residue being independently selected from glucose and alkyl or hydroxyalkyl substituted glucose derivatives, said cyclodextrin being water soluble.

4,877,779

2-AMINOMETHYLALKYNYLALKYL-1,3-DITHIANE DERIVATIVES

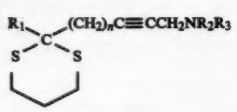
Waclaw J. Rzeszotarski, Millersville; Maria E. Guzewska, Pasadena; John P. Carter, Baltimore; Theodore C. Adams, Perry Hall; Andrea C. Dupont, Latherville, and Carl Kaiser, Millersville, all of Md., assignors to Marion Laboratories, Inc., Kansas City, Mo.

Filed May 17, 1988, Ser. No. 194,903

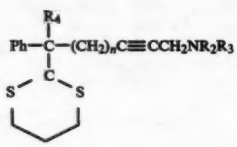
Int. Cl.[4] A61K *31/385, 31/535;* C07D *405/12, 339/08*

U.S. Cl. 514—63 4 Claims

1. A compound of Formula I or II



I



II

or a pharmaceutically acceptable salt thereof wherein:

R_1 is selected from the group consisting of hydrogen, phenyl, 9H-fluoren-9-yl, 10,11-dihydro-5H-dibenzo[a,d]cycloheptene-5-yl, 5H-dibenzo[a,d]cycloheptene-5-yl, 9H-xanthen-9-yl, 9H-thioxanthen-9-yl, 2-chloro-9H-thioxanthen-9-yl, 1,2,3,4-tetrahydro-1-naphthyl, 4H-chromanyl, diphenylmethyl, phenylcycloalkylmethyl, phenylcycloalkylmethyl in each of which the bridgehead methylene is substituted with a hydroxy group, and the foregoing phenyl or benzo-fused rings substituted with one or more R_5 groups;

R_2 and R_3, which may be the same or different, are selected from the group consisting of hydrogen, lower alkyl, phenylalkyl (C_1–C_5), and phenylalkyl substituted with one or more R_5 groups, or NR_2R_3 taken together are selected from the group consisting of pyrrolidinyl, piperidinyl, morpholinyl, thiomorpholinyl, 1-piperazinyl and 1-piperazinyl substituted at the 4-position with hydrogen, lower alkyl, hydroxy-substituted lower alkyl, amino-substituted lower alkyl, or acetoxy-substituted lower alkyl;

R_4 is hydrogen, hydroxyl or trimethylsilyloxy;

R_5 is selected from the group consisting of halogen, trifluoromethyl, lower alkyl, hydroxy and lower alkoxy groups;

Ph is an unsubstituted phenyl group or a phenyl group substituted by one or more R_5 groups; and

n is 2–4.

4,877,780

ANTIEMETIC N-SUBSTITUTED BENZAMIDES

Armando Vega-Noverola; Jose M. Prieto Soto; Fernando P. Noguera; Jacinto M. Mauri, all of Barcelona, and Robert G. W. Spickett, Tibidabo, all of Spain, assignors to Fordonal, S.A., Madrid, Spain

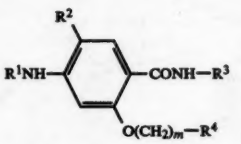
Filed Jul. 12, 1988, Ser. No. 217,646

Claims priority, application United Kingdom, Aug. 3, 1987, 8718345

Int. Cl.[4] A61K *31/625;* C07D *453/02*

U.S. Cl. 514—161 15 Claims

1. A compound of the formula:

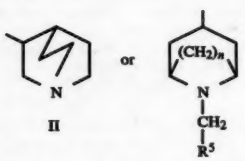


I

wherein R^1 represents hydrogen, a C_{1-6} alkyl group or an acetyl group;

R^2 represents halogen;

R^3 represents a group of the formula:



II

or

III

wherein R^5 represents hydrogen or a phenyl or non-aromatic cyclic ether group and n is 2 or 3;

R^4 represents a C_{3-6} cycloalkyl, cyclohexenyl, C_{1-6} alkoxy, trifluoromethyl, tetrahydrofuryl, 1,3-dioxolanyl or phenoxy group;

m is 0, 1, 2, 3 or 4 with the provisos that when m is 0, then R^4 is only a C_{3-6} cycloalkyl or tetrahydrofuryl group, and when R^3 is II and m is 1, then R^4 is only a C_{3-6} cycloalkyl, cyclohexenyl, C_{1-6} alkoxy, trifluoromethyl, 3-tetrahydrofuryl or phenoxy group and when R^3 is II and m is 2, then R^4 is only a C_{3-6} cycloalkyl, cyclohexenyl, trifluoromethyl, tetrahydrofuryl, 1,3-dioxolanyl or phenoxy group, and when R^3 is II and m is 3, then R^4 is only a C_{3-6} cycloalkyl, cyclohexenyl, trifluoromethyl, tetrahydrofuryl, 1,3-dioxolanyl or a phenoxy group;

or a pharmacologically acceptable acid addition salt, quaternary ammonium salt or a N-oxide thereof.

14. A method of combatting gastro-intestinal disorders which comprises administering to a patient suffering from or expected to suffer from gastro-intestinal disorders an effective amount of a compound of formula I or a pharmacologically acceptable salt or N-oxide thereof as defined in claim 1.

4,877,781

MEDICAL DISPENSER AND PREPARATION FOR INFLAMED TISSUE

Peter G. LaHaye, Medina, Wash., and John A. Selling, Menlo Park, Calif., assignors to Peter G. LaHaye, Medina, Wash.

Filed Sep. 30, 1987, Ser. No. 102,877

Int. Cl.[4] A61K *31/56*

U.S. Cl. 514—179 20 Claims

1. A composition for the treatment of inflamed tissue, comprising:

tixocortol pivolate in an amount sufficient to provide anti-in-

flammatory, anti-pruritic, and vasoconstrictive effects to the inflamed tissue;

pramoxine hydrogen chloride in an amount sufficient to anesthetize the inflamed tissue; and

ephedrine sulfate in an amount sufficient to minimize arteriovenous shunting of the inflamed tissue.

4,877,782

ZINC CEFTIOFUR COMPLEXES

Alexander R. Cazers, Richland, and K. Thomas Koshy, Kalamazoo, both of Mich., assignors to The Upjohn Company, Kalamazoo, Mich.

Filed Feb. 16, 1988, Ser. No. 156,360

Int. Cl.[4] C07D *501/56;* **A61K** *31/545*

U.S. Cl. 514—186 **5 Claims**

1. A complex of ionic zinc and a ceftiofur molecule selected from the group consisting of ceftiofur per se, a ceftiofur hydrohalide where the halide is chloride or bromide and a ceftiofur alkali metal or alkaline earth metal salt where the metal salt ion is selected from the group consisting of sodium, potassium, calcium and magnesium.

4,877,783

β-LACTAM ANTIBACTERIAL AGENTS

Peter H. Milner, Horsham, England, assignor to Beecham Group p.l.c., England

Continuation of Ser. No. 401,266, Jul. 23, 1982, Pat. No. 4,539,149. This application Jan. 24, 1985, Ser. No. 694,622

Claims priority, application United Kingdom, Jul. 25, 1981, 8123033; Jul. 25, 1981, 8123034; Dec. 7, 1981, 8136823; Dec. 7, 1981, 8136824; Mar. 18, 1982, 8207966; Apr. 3, 1982, 8209953; Apr. 3, 1982, 8209954; May 22, 1982, 8215007

The portion of the term of this patent subsequent to Sep. 3, 2002, has been disclaimed.

Int. Cl.[4] A61K *31/43, 31/545;* **C07D** *499/44, 501/42*

U.S. Cl. 514—194 **34 Claims**

1. A beta-lactam antibiotic having an α-formamido substituent on the carbon atom adjacent to the carbonyl group of the beta-lactam group and having antibacterial activity.

13. A pharmaceutical composition useful for treating bacterial infections in humans and animals which comprises an antibacterially effective amount of a beta-lactam antibiotic having an α-formamido substituent on the carbon atom adjacent to the carbonyl group of the beta-lactam group having antibacterial activity, and a beta-lactamase inhibitory amount of a beta-lactamase inhibitor, in combination with a pharmaceutically acceptable carrier.

4,877,784

HISTIDYLPROLINEAMIDE DERIVATIVES

Kiyoshi Kimura, Yasuokatermachi; Takashi Ogasawara, Ugi, and Takeshi Mushiroi, Kyoto, all of, assignors to Nippon Shinyaku Co., Ltd., Japan

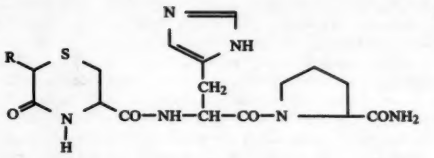
Filed Jun. 20, 1988, Ser. No. 209,287

Claims priority, application Japan, Jun. 19, 1987, 62-154237

Int. Cl.[4] A61K *31/54*

U.S. Cl. 514—227.8 **6 Claims**

1. A method of treating epilepsy in humans and animals which comprises administering to a human or animal in need thereof a therapeutically effective amount of a compound of the formula I



(I)

wherein R is lower alkyl, in combination with a pharmaceutically acceptably carrier.

4,877,785

NON-PEPTIDYL BETA-SUCCINAMIDOACYL AMINODIOLS AS ANTI-HYPERTENSIVE AGENTS

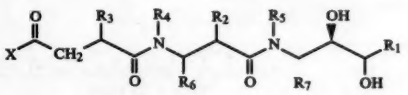
Gunnar J. Hanson, Skokie, and John S. Baran, Winnetka, both of Ill., assignors to G. D. Searle & Co., Chicago, Ill.

Filed Oct. 1, 1987, Ser. No. 103,987

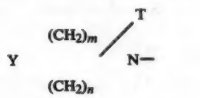
Int. Cl.[4] H01K *37/43;* **C07D** *279/04, 265/30, 265/36, 279/16, 279/04, 207/00, 263/02, 209/04, 209/44;* **C07F** *3/06, 239/00, 451/02, 215/00*

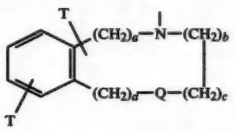
U.S. Cl. 514—224.2 **45 Claims**

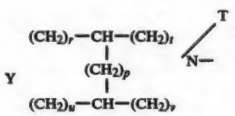
1. A compound of the formula:



wherein X is selected from







wherein Y and Q are selected from CH_2,

O, S, SO, SO_2 and NR_{11}, wherein R_{10} is H or lower alkyl, R_{11} is selected from H, phenyl and

and wherein R_{12} is H or lower alkyl; wherein each of m and n is independently an integer from 1 through 4; wherein each of r, t, u and v is independently an integer from zero through two; wherein p is an integer from 1 through 3; wherein each of a through d is independently an integer from zero through 3; wherein T is selected from one or more groups selected from H, linear or branched lower alkyl, alkoxy, oxo, halo, haloalkyl, lower alkenyl, lower alkynyl and cyano; wherein R_1 is selected from H, linear or branched lower alkyl, haloalkyl, alkylcycloalkyl, alkylcycloalkenyl and alkoxycarbonyl; wherein R_2 is selected from linear or branched lower alkyl, imidazolmethyl and benzyl; wherein R_3 is selected from lower alkyl, acylaminoalkyl, benzyl, naphthylmethyl, aryl and benzyl substituted at the phenyl portion by halo or lower alkyl or by both; wherein each of R_4 and R_5 is independently selected from H and lower alkyl; wherein R_6 is selected from H or phenyl; wherein R_7 is selected from substituted or unsubstituted cycloalkyl, phenyl, cycloalkylalkyl and phenylalkyl, any one of which may be substituted with one or more groups selected from alkyl, alkoxy, halo, haloalkyl, lower alkenyl, lower alkynyl and cyano; and wherein each of R_8 and R_9 is independently selected from the groups H, lower alkyl, cycloalkyl, phenyl, benzyl, naphthyl and naphthylmethyl, any one of which groups having a substitutable position may be optionally substituted with or more of lower alkyl, alkoxy, alkenyl, alkynyl, halo, haloalkyl, cyano and phenyl, with the proviso that at least one of R_8 and R_9 is an aryl group.

4,877,786
AMINOMETHYLISOXAZOLIDINES, FUNGICIDAL COMPOSITIONS AND USE

Joachim Weissmüller, Monheim; Dieter Berg, Wuppertal; Gerd Hänssler, and Paul Reinecke, both of Leverkusen, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

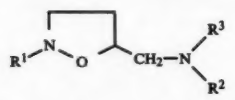
Filed Dec. 8, 1987, Ser. No. 130,375

Claims priority, application Fed. Rep. of Germany, Dec. 22, 1986, 3643942

Int. Cl.[4] A01N *43/80, 43/84;* **C07D** *261/08, 413/06*

U.S. Cl. 514—236.8 **8 Claims**

1. An aminomethylisoxazolidine of the formula



in which

R^1 represents arylalkyl, aryloxyalkyl or arylthioalkyl with in each case 6 to 10 carbon atoms in the aryl part and 1 to 10 carbon atoms in the straight-chain or branched alkyl part, optionally mono-substituted or poly-substituted in the aryl part by identical or different substituents selected from the group consisting of halogen, cyano, nitro, in each case straight-chain or branched alkyl, alkoxy, alkylthio, halogenoalkyl, halogenoalkoxy and halogenoalkylthio with in each case 1 to 6 carbon atoms and where appropriate 1 to 9 identical or different halogen atoms, amino and in each case straight-chain or branched alkylamino, dialkylamino and alkoximinoalkyl with in each case 1 to 4 carbon atoms in the individual alkyl parts, and

R^2 and R^3, together with the nitrogen atom to which they are bonded, represent a saturated 5-to 7-membered heterocyclic radical which optionally can contain further hetero atoms, and is optionally monosubstituted or polysubstituted by identical or different substituents selected from the group consisting of in each case straight-chain or branched alkyl or hydroxyalkyl with in each case 1 to 4 carbon atoms.

6. A fungicidal composition comprising a fungicidally effective amount of a compound or salt according to claim 1 and a diluent.

4,877,787
BENZYLTHIO PYRIDAZINONE DERIVATIVES, PREPARATION THEREOF, AND INSECTICIDAL ACARICIDAL, FUNGICIDAL COMPOSITIONS

Masakazu Taniguchi, Funabashi; Masayoshi Hirose, Kawaguchi; Masatoshi Baba, Narashino; Kiminori Hirata, Urawa, and Yoshinori Ochiai, Hasuda, all of Japan, assignors to Nissan Chemical Industries, Tokyo, Japan

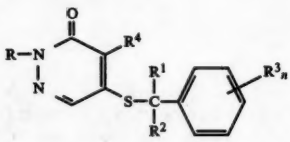
Continuation of Ser. No. 621,458, Jun. 18, 1984, abandoned. This application Mar. 17, 1987, Ser. No. 27,191

Claims priority, application Japan, Jun. 23, 1983, 58-113409; Jul. 29, 1983, 58-138878

Int. Cl.[4] A01N *43/58;* **C07D** *403/12, 401/12, 237/18*

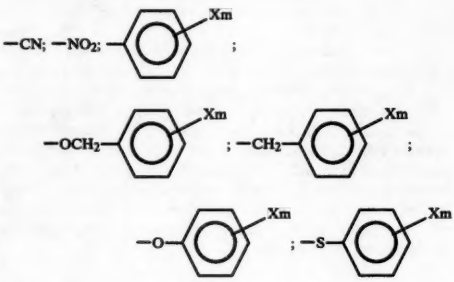
U.S. Cl. 514—247 **16 Claims**

1. A 3(2H)-pyridazinone derivative having formula (I):



(I)

wherein, R denotes C_2 to C_6 alkyl, R^1 and R^2 denote each independently hydrogen or a lower alkyl, R^4 denotes a halogen, R^3 denotes a halogen, a straight or branched C_1 to C_{12} alkyl, a cycloalkyl unsubstituted or substituted by a lower alkyl; a straight or branched C_1 to C_{12} alkoxy; a lower haloalkyl; a lower haloalkoxy;



(wherein X denotes a halogen, a lower alkyl, a cycloalkyl, a lower alkoxy, a lower haloalkyl, a lower haloalkoxy, —CN or $—NO_2$, and m denotes 0 or an integer of 1 to 5, said X being the same or different when m is an integer of 2 to 5); a pyridyloxy which may be substituted by a halogen and/or $—CF_3$; a quinoxalyloxy which may be substituted by a halogen and/or $—CF_3$; a lower alkenyloxy; a lower alkylthio; a lower haloalkylthio; $—Si(CH_3)_3$; —OH; $—N(CH_3)_2$; —SCN; $—COOCH_3$; or $—OCH(CH_3)COOC_2H_5$, and n denotes an integer of 1 to 5, said R^3 being the same or different when n is an integer of 2 to 5.

4. A method for insecticidal, acaricidal, and/or fungicidal treatment in the agricultural and horticultural field by applying an effective amount of a compound of the formula (I) of claim 1.

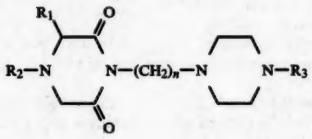
4,877,788

NEW PIPERAZINYLALKYLPIPERAZINEDIONE COMPOUNDS

Gilbert Lavielle, La-Celle St-Cloud, and Jean Claude Poignant, Bures S/Yvette, both of France, assignors to Adir Et Cie, Neuilly-sur-Seine, France

Filed Jun. 14, 1988, Ser. No. 206,512
Claims priority, application France, Jun. 15, 1987, 87 08263
Int. Cl.[4] A61K *31/495;* C07D *471/04*
U.S. Cl. 514—252 6 Claims

1. Compounds selected from those of formula I:



(I)

in which

R_1 and R_2 form together and with the piperazine-2,6-dione radical to which they are attached a hexahydropyrazinoisoquinolinedione radical pyrimidinyl radical or a phenyl radical optionally substituted by an alkyl radical of 1 to 4 carbon atoms or a trifluoromethyl radical,

n is an integer of from 2 to 4 inclusive

and addition salts there of with a pharmaceutically acceptable inorganic or organic acid.

4,877,789

EICOSATRIYNOIC ACID ESTERS AND AMIDES AND THEIR APPLICATION IN PHARMACEUTICAL AND COSMETIC PRACTICE

Braham Shroot, Antibes; Christopher Hensby, Biot; Jean Maignan, Tremblay les Gonesses; Gerard Lang, Saint Gratien; Serge Restle, Aulnay sous Bois, and Michel Colin, Livry Gargan, all of France, assignors to Centre International de Recherches Dermatologiques dite C.I.R.D., Valbonne, France

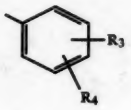
Filed Jul. 3, 1986, Ser. No. 881,776
Claims priority, application France, Jul. 5, 1985, 85 10363
Int. Cl.[4] C07D *257/04;* C07C *103/60;* A61K *31/16;* A01N *43/48*
U.S. Cl. 514—255 13 Claims

1. A compound having the formula:

$$C_8H_{17}—(C{\equiv}C—CH_2)_3CH_2CH_2COR \quad (I)$$

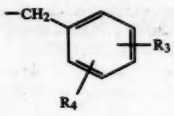
wherein R is (i) an amino group having the formula

wherein R_1 or R_2, which may be identical or different, denote a hydrogen atom or a linear or branched C_1–C_8 lower alkyl radical, optionally interrupted by one or more hereto atoms chosen from oxygen, sulphur and nitrogen, said lower alkyl radical being unsubstituted or substituted with one or more hydroxyl groups, R_1 and R_2 not being able to denote hydrogen simultaneously, or alternatively R_1 and R_2 form, together with the nitrogen atom, a heterocyclic system optionally containing oxygen, sulphur or nitrogen as an additional hetero atom, one of the radicals R_1 and R_2 also being to denote, when the other is a hydrogen atom, an aryl radical of formula (II):



(II)

or alternatively a benzyl radical of formula (III):



(III)

in which formulae R_3 and R_4, denote, independently of each other, a hydrogen atom, a C_1–C_4 alkyl radical, a hydroxyl group, a halogen atom or a carboxyl or trifluoromethyl group or (ii) a glucosamine, and the isomers and salts thereof which are pharmaceutically and cosmetically acceptable.

4,877,790

QUINAZOLINE DERIVATIVE, PROCESSES FOR ITS PRODUCTION, AND CEREBRAL DYSFUNCTION REMEDYING AGENT COMPRISING IT AS ACTIVE INGREDIENT

Ryuichi Iemura, Toyonaka; Manabu Hori, Osaka; Hiroshi Ohtaka, Osaka; Takayuki Sukamoto, Osaka; Hideaki Hara, Osaka, and Keizo Ito, Osaka, all of Japan, assignors to Kanebo Limited, Toky, Japan

Filed Dec. 15, 1987, Ser. No. 134,302
Int. Cl.[4] A61K *31/505;* C07D *239/84*
U.S. Cl. 514—260 2 Claims

1. A quinazoline compound of the formula or a pharmacologically acceptable acid addition salt thereof.

2. A composition for remedying cerebral dysfunction comprising a pharmaceutically effective amount of a quinazoline compound of the formula or a pharmacologically acceptable acid addition salt thereof and a pharmaceutically acceptable carrier or diluent therefor.

4,877,791

METHOD OF TREATMENT FOR INTERESTITIAL CYSTITIS

Fred P. Sherman, Hollywood, Fla., assignor to Baker Cummins Pharmaceuticals, Inc., Miami, Fla.

Filed Nov. 1, 1988, Ser. No. 265,575
Int. Cl.[4] A61K *31/485*
U.S. Cl. 514—282 8 Claims

1. A method of treating a patient suffering from interstitial cystitis comprising the daily administration to the patient of from about 1 to about 50 mg of nalmefene or naltrexone.

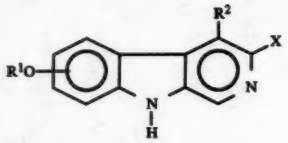
4,877,792

HETEROARYLOXY-BETA-CARBOLINE DERIVATIVES, THEIR PREPARATION AND THEIR USE AS MEDICINAL AGENTS

Helmut Biere; Andreas Huth; Dieter Rahtz; Ralph Schmiechen; Dieter Seidelmann; David N. Stephens, all of Berlin, Fed. Rep. of Germany; Mogens Engelstoft, Vaerlose, and John B. Hansen, Lyngby, both of Denmark, assignors to Schering Aktiengesellschaft, Fed. Rep. of Germany

Filed Mar. 9, 1987, Ser. No. 23,752
Claims priority, application Fed. Rep. of Germany, Mar. 8, 1986, 3608089
Int. Cl.[4] A61K *31/395;* C07D *471/04, 417/14*
U.S. Cl. 514—292 18 Claims

1. A heteroaryloxy-β-carboline of the formula

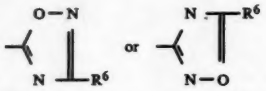


wherein

R^1 is pyridine, furan, thiophene, pyrrole, imidazole or thiazole, or one of the above substituted by halo, nitro, amino, cyano, C_{1-6}-alkyl, or (C_{1-6}-alkoxy)carbonyl,

R^2 is hydrogen, C_{1-6}-alkyl or C_{1-6}-alkoxy-C_{1-6}-alkyl,

X is $COOR^3$, $CONR^4R^5$, or oxadiazoyl of the formula



R^3 is H or C_{1-6}-alkyl,

R^4 and R^5 independently are each H or C_{1-6}-alkyl, and

R^5 is hydrogen, C_{1-6}-alkyl or C_{3-7}-cycloalyl.

18. A method of claim **16** for treating anxiety accompanied by depression, epilepsy, sleep disturbance or spasticity or for achieving muscle relaxation during anesthesia.

4,877,793

THIENO[3,2-B]PYRIDINE-6-CARBOXAMIDE COMPOUNDS USEFUL IN TREATING HYPERTENSION

Roy V. Davies, Nottingham, Great Britain, assignor to The Boots Company, PLC, Nottingham, England

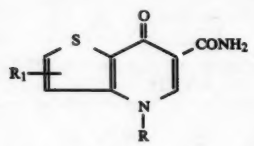
Filed Nov. 19, 1987, Ser. No. 122,394

Claims priority, application United Kingdom, Nov. 20, 1986, 8627698

Int. Cl.[4] C07D *213/32*

U.S. Cl. 514—301 **18 Claims**

1. A compound of the formula,



in which R is lower alkyl, and R_1 is hydrogen, lower alkyl, lower alkoxy, halo, trifluoromethyl, or phenyl unsubstituted or substituted with one or two substituents selected, from the group consisting of halo, lower alkyl, lower alkoxy and trifluoromethyl.

4,877,794

2-ALKOXY-N-(1-AZABICYCLO(2.2.2)OCT-3-YL) BENZAMIDE AND THIOBENZAMIDE COMPOSITIONS AND THE USE THEREOF TO TREAT SCHIZOPHRENIA

Robert J. Naylor, and Brenda Naylor, both of Ilkley, England, assignors to A. H. Robins Company, Incorporated, Richmond, Va.

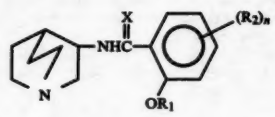
Filed Sep. 6, 1988, Ser. No. 240,868

Claims priority, application United Kingdom, Sep. 4, 1987, 8720805

Int. Cl.[4] A61U *31/44*

U.S. Cl. 514—305 **8 Claims**

1. A method of treating schizophrenia in a warm-blooded animal comprising administering to said animal a pharmaceutical composition comprising a compound of general formula I:



(I)

wherein:

X represents oxygen or sulphur;

R^1 represents loweralkyl;

R^2 represents hydrogen, halo, 4,5-benzo, loweralkoxy, amino, methylamino or dimethylamino; and

n is 1 or 2;

or a pharmaceutically acceptable acid addition salt thereof, in an amount sufficient to control schizophrenia; and a pharmaceutically acceptable carrier.

4,877,795

4H-QUINOLIZIN-4-ONE COMPOUNDS USEFUL FOR THE TREATMENT OF ALLERGIC BRONCHIAL ASTHMA, ALLERGIC RHINITIS ATROPIC DERMATITIS AND THE LIKE

Yoshikazu Kurashina; Hiroshi Miyata, and Den-ichi Momose, all of Matsumoto, Japan, assignors to Kissei Pharmaceutical Co., Ltd., Japan

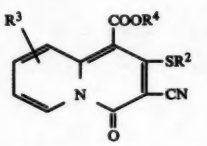
Filed Jan. 25, 1988, Ser. No. 147,549

Claims priority, application Japan, Jan. 30, 1987, 62-19734; Jan. 30, 1987, 62-19735; Jan. 30, 1987, 62-19736; Jan. 30, 1987, 62-19737; Feb. 12, 1987, 62-30603; Feb. 12, 1987, 62-30604; Feb. 12, 1987, 62-30605

Int. Cl.[4] C07D *455/02*; A61K *31/435*

U.S. Cl. 514—306 **12 Claims**

1. A 4H-quinolizin-4-one compound corresponding to the formula:



where R^2 is an alkyl, alkenyl or aralkyl group having up to 18 carbon atoms; R^3 is hydrogen or an alkyl group having 1 to 6 carbon atoms; R^4 is a substituent having up to 16 carbon atoms which is alkenyl, alkynyl, cycloalkyl, cycloalkyl-alkyl, cycloalkenyl, cycloalkyl-alkenyl, aralkyl, aralkenyl, aryloxyalkyl or arylthioalkyl.

4. A method for the treatment of allergic bronchial asthma, allergic rhinitis, atopic dermatitis and hypersensitiveness diseases associated with immunoglobulin E-antibody formation in a mammal which comprises administering an effective dosage from about 0.1 mg to 10 mg per Kg of mammal weight by oral administration or from about 0.02 mg to 5 mg per Kg of mammal weight by parenteral administration per day of an immunoglobulin E-antibody formation-inhibiting 4H-quinolizin-4-one compound to the mammal.

4,877,796

DECAHYDROQUINOLINES AND CENTRAL ANALGESIC METHOD OF USE THEREOF

Francois Clemence; Odile Le Martret, both of Paris; Francoise Delevallee, Fontenay Sous Bois, and Michel Fortin, Paris, all of France, assignors to Roussel Uclaf, Paris, France

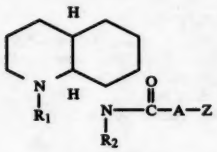
Filed Aug. 12, 1987, Ser. No. 84,456

Claims priority, application France, Aug. 12, 1986, 86 11620; Jul. 9, 1987, 87 09747

Int. Cl.[4] C07D *215/40;* A61K *31/47*

U.S. Cl. 514—311 18 Claims

1. A compound selected from the group consisting of all enantiomeric and diastereoisomeric forms of a decahydroquinoline of the formula



I

wherein R_1 is alkyl of 1 to 5 carbon atoms, R_2 is selected from the group consisting of hydrogen and alkyl of 1 to 5 carbon atoms, A is selected from the group consisting of $-(CH_2)_n$ and $-CH_2O-$, n is an integer from 1 to 5, Z is selected from the group consisting of phenyl, phenyl substituted with at least one member of the group consisting of alkyl and alkoxy of 1 to 5 carbon atoms, halogen, —OH, $-CF_3$, $-NO_2$ $-NH_2$ and mono and dialkylamino of 1 to 5 carbon atoms, naphthyl indenyl, and naphthyl and indenyl substituted with at least one member of the group consisting of alkyl and alkoxy of 1 to 5 carbon atoms, $-CF_3$, $-NO_2$, $-NH_2$, mono and dialkylamino of 1 to 5 carbon atoms and phenyl optionally substituted with one or more members of the group consisting of alkyl and alkoxy of 1 to 5 carbon atoms and halogen and their non-toxic, pharmaceutically acceptable acid addition salts and quaternary ammonium salts.

13. A method of inducing central analgesic activity in warm-blooded animals comprising administering to warm-blooded animals a central analgesically effective amount of at least one compound of claim 1.

4,877,797

1,4-DIHYDROPYRIDINE DERIVATIVES AND PHARMACEUTICAL COMPOSITIONS CONTAINING SAME

Hiroaki Satoh, Saitama; Hiroyasu Koyama, Ageo; Yoshikuni Suzuki, Ohmiya; Toshiji Sugai, and Koichi Watanabe, both of Saitama, all of Japan, assignors to Nisshin Flour Milling Co., Ltd., Tokyo, Japan

Filed Jun. 15, 1987, Ser. No. 67,719

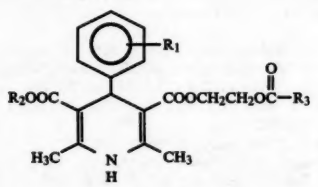
Claims priority, application Japan, Jun. 13, 1986, 61-136152

The portion of the term of this patent subsequent to Jul. 12, 2005, has been disclaimed.

Int. Cl.[4] A61K *31/44;* C07D *401/12*

U.S. Cl. 514—314 10 Claims

1. A compound of formula I



(I)

wherein R_1 is a nitro or trifluoromethyl group; R_2 is a C_1–C_6 alkyl group; R_3 is a pyridyl or pyridyl N-oxide group fused with a benzene or naphthalene ring, said ring being optionally substituted with C_1–C_6 alkyl, C_1–C_6 alkoxy, halogen or haloalkyl wherein the alkyl moiety has 1–3 carbon atoms, said pyridyl or pyridyl N-oxide group optionally being substituted at a carbon atom with halogen or hydroxyl, and a pharmaceutically acceptable acid addition salt thereof.

4,877,798

TREATMENT OF FIBROMYALGIA

Stephen M. Sorensen, Cincinnati, Ohio, assignor to Merrell Dow Pharmaceuticals Inc., Cincinnati, Ohio

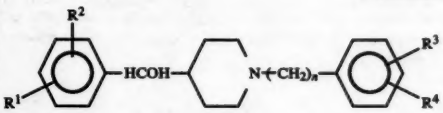
Continuation of Ser. No. 123,755, Nov. 23, 1987, abandoned. This application Oct. 18, 1988, Ser. No. 262,168

Int. Cl.[4] A61K *31/445*

U.S. Cl. 514—317 8 Claims

1. A method for relieving or alleviating the symptomatology of fibromyalgia in a patient in need thereof comprising administering thereto an antifibromyalgia amount of a compound of the formula:

FORMULA I



wherein: each of R^1, R^2, R^3, and R^4 are independently selected from the group consisting of hydrogen, a C_{1-6} alkyl group, halogen, trifluoromethyl, hydroxy, a C_{1-6} alkoxy group, and an amino group; n is 2, 3, or 4; and the pharmaceutically acceptable acid addition salts thereof.

4,877,799

METHOD OF TREATING CALCIUM OVERLOAD IN BRAIN CELLS OF MAMMALS

Jorgen Drejer, Bronshoj, and Palle Jakobsen, Vaerlose, both of Denmark, assignors to A/S Ferrosan, Soeborg, Denmark

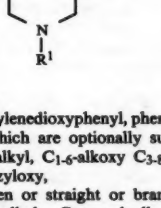
Filed Oct. 8, 1987, Ser. No. 106,154

Claims priority, application Denmark, Nov. 3, 1986, 5232/86; Jun. 25, 1987, 3234/87

Int. Cl.[4] A61K *31/36, 31/38, 31/445*

U.S. Cl. 514—317 8 Claims

1. A method of treating calcium overload in brain cells of a mammal in need thereof, which comprises the step of administering to the said mammal a calcium overload blocking amount of a piperidine compound having the formula IV



(IV)

wherein

R^3 is 3,4-methylenedioxyphenyl, phenyl, naphthyl, or benzothiazolyl which are optionally substituted with one or more C_{1-6}-alkyl, C_{1-6}-alkoxy C_{3-8}-cycloalkyl, C_{3-5}-alkylene or benzyloxy,

R^1 is hydrogen or straight or branched C_{1-8}-alkyl, C_{1-8}-alkoxy-C_{1-8}-alkyl, C_{4-7}-cycloalkyl phenoxy-C_{1-8}-alkyl,

C_{1-6}alkoxyphenoxy-C_{1-8}-alkyl, C_{4-8}-alkenyl, or C_{4-8}-cycloalkylalkyl,

X is hydrogen or halogen, and wherein

Y is O or S or a salt thereof with a pharamceutically-acceptable acid or a pharmaceutical composition thereof.

4,877,800

ANTIPSYCHOTIC COMPOSITIONS CONTAINING DIOXOPIPERIDINE DERIVATIVES

Brenda Costall, North Yorkshire, United Kingdom, assignor to National Research Development Corporation, London, England

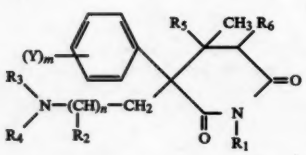
Filed Jul. 11, 1988, Ser. No. 217,450

Claims priority, application United Kingdom, Jul. 10, 1987, 8716337

Int. Cl.[4] A61K *31/445*

U.S. Cl. 514—328 8 Claims

1. A method of treatment of psychosis which comprises administering to a patient suffering a psychotic disorder an anti-psychotic effective amount of a compound of the following Formula I.



(I)

wherein:

R_1 represents hydrogen or C_1–C_4 alkyl;

n is 1 or 2;

R_2 represents hydrogen or methyl, provided that one R_2 is hydrogen when n is 2;

R_3 represents hydrogen or C_1–C_2 alkyl;

R_4 represents C_1–C_2 alkyl;

R_5 and R_6 independently represent hydrogen or methyl;

m is 0 to 3; and

each X is in a meta or para position and independently represents hydroxy, C_1–C_2 alkoxy, C_1–C_2 alkyl, C_1–C_2 hydroxyalkyl, halogen, or trifluoromethyl, provided that hydroxy and alkoxy are not in the para position, or a pharmacologically acceptable salt thereof.

4,877,801

1-ARYL-1-(1H-AZOL-1-YLALKYL)-1,3-DIHYDROISOBENZOFURANS, RELATED DERIVATIVES AND PHARMACEUTICAL COMPOSITIONS THEREOF USEFUL AS ANTIFUNGALS

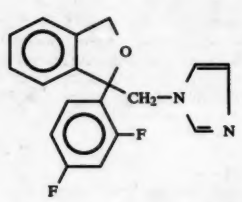
Raymond G. Lovey, West Caldwell, N.J., and Arthur J. Elliott, Sloatsburg, N.Y., assignors to Schering Corporation, Kenilworth, N.J.

Division of Ser. No. 697,539, Feb. 1, 1985, Pat. No. 4,737,508. This application Apr. 6, 1988, Ser. No. 183,267

Int. Cl.[4] C07D *405/06*

U.S. Cl. 548—336 1 Claim

1. A compound which is 1-(2,4-difluorophenyl)-1-(1H-imidazol-1-ylmethyl)-1,3-dihydroisobenzofuran and is represented by the formula:



4,877,802

THIAZOLE DERIVATIVES

John R. H. Wilson, Rainham, and Ernest Haddock, Sheerness, both of England, assignors to Shell Internationale Research Maatschappij B.V., The Hague, Netherlands

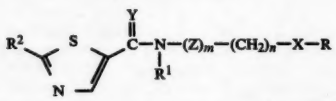
Filed May 27, 1988, Ser. No. 199,430

Claims priority, application United Kingdom, Jun. 25, 1987, 8714920

Int. Cl.[4] C07D *277/56;* A01N *43/78*

U.S. Cl. 514—365 10 Claims

1. A compound of the general formula:



(I)

or an acid-addition salt thereof, in which R represents a phenyl or naphthyl group optionally substituted by one or more substituents selected from the group consisting of halogen atoms, nitro, cyano, hydroxyl, C_{1-6} alkyl, C_{1-6} haloalkyl, C_{1-6} alkoxy, C_{1-6} haloalkoxy, amino, C_{1-6} alkylamino, di-C_{1-6} alkylamino, carbonyl, C_{1-6} alkoxycarbonyl, carboxyl, C_{1-6} alkanoyl, C_{1-6} alkylthio, C_{1-6} alkylsulfinyl, C_{1-6} alkylsulfonyl, carbamoyl, C_{1-6} alkylamido, C_{3-6} cycloalkyl, and phenyl groups; R^1 represents a hydrogen atom or a C_{1-8} alkyl group, a C_{2-6} alkenyl group or a C_{2-6} alkynyl group, each of said alkyl, alkenyl or alkynyl groups being optionally substituted by one or more substituents selected from the group consisting of halogen atoms, nitro, cyano, hydroxyl, carboxyl, carbonyl, amino, C_{1-4} alkylamino, di-C_{1-4} alkylamino, C_{1-4} alkoxy or haloalkoxy and C_{1-4} alkoxycarbonyl groups; R^2 represents a hydrogen or halogen atom or a C_{1-8} alkyl, C_{1-8} haloalkyl, C_{1-8} alkoxy, C_{1-8} haloalkoxy, C_{1-8} alkylthio, hydroxyl, cyano, nitro, amino, C_{1-8} alkylamino, di-C_{1-8} alkylamino or morpholine group; X represents an oxygen or sulfur atom, a carbonyl group or a group $—CR^4R^5—$ where R^4 and R^5 independently represent a hydrogen atom or a C_{1-8} alkoxy group: Y represents an oxygen or sulfur atom; n represents an integer from 0 to 6; m is 0 or 1; and Z represents a phenyl group; with the proviso that m and n do not simultaneously represent 0.

4,877,803

BIS-DIOXOPIPERAZINE DERIVATIVES AND PHARMACEUTICAL COMPOSITIONS CONTAINING THE SAME

Jun-Chao Cai, and Muneaki Takase, both of Tokyo, Japan, assignors to Zenyaku Kogyo Kabushiki Kaisha, Tokyo, Japan

PCT No. PCT/JP86/00324, § 371 Date Feb. 24, 1987, § 102(e) Date Feb. 24, 1987, PCT Pub. No. WO87/00170, PCT Pub. Date Jan. 15, 1987

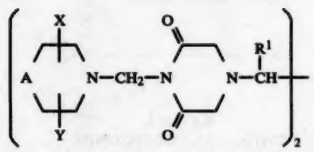
PCT Filed Jun. 25, 1986, Ser. No. 31,011

Claims priority, application Japan, Jun. 26, 1985, 60-139731

Int. Cl.[4] A61K *31/435;* C07D *413/14*

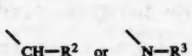
U.S. Cl. 514—227.8 10 Claims

1. A compound represented by the formula (I):



(I)

wherein R^1 represents a lower alkyl group; A represents an oxygen atom, a sulfur atom or a group of



wherein R^2 represents a hydrogen atom, a lower alkyl group or phenyl; R^3 represents a lower alkyl group, phenyl or benzyl; and X and Y, which are respectively independent and are the same or different, represent a hydrogen atom or a lower alkyl group.

4,877,804

THIADIAZOLE DERIVATIVE, AND INSECTICIDAL AND MITICIDAL COMPOSITION CONTAINING THE DERIVATIVE AS THE EFFECTIVE INGREDIENT

Susumu Matsumoto, Yokohama; Hiroki Ohta, Kokubunji; Masahiro Yamada, Machida; Yoshiaki Higashino, and Toshiki Fukuchi, both of Yokohama, all of Japan, assignors to Mitsubishi Chemical Industries Limited, Tokyo, Japan

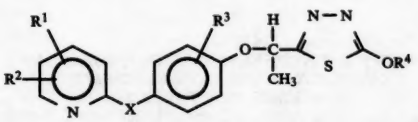
Filed Mar. 31, 1988, Ser. No. 176,297

Claims priority, application Japan, Mar. 31, 1987, 62-78311

Int. Cl.[4] C07D *417/10*; A61K *31/44*

U.S. Cl. 514—342 **9 Claims**

1. A thiadiazole derivative represented by the formula (I):



(I)

wherein R^1 and R^2 independently represent hydrogen atom, halogen atom, lower haloalkyl group, lower alkoxycarbonyl group or cyano group, R^3 represents hydrogen atom or halogen atom, R^4 represents lower alkyl group, X represents oxyen atom or sulfur atom.

4,877,805

METHODS FOR TREATMENT OF SUNDAMAGED HUMAN SKIN WITH RETINOIDS

Albert M. Kligman, c/o Dept. of Dermatology, University of Pennsylvania, Philadelphia, Pa. 19104

Continuation of Ser. No. 886,595, Jul. 16, 1986, abandoned, which is a continuation-in-part of Ser. No. 759,505, Jul. 26, 1985, Pat. No. 4,603,146, which is a continuation of Ser. No. 610,711, May 16, 1984, abandoned, which is a continuation-in-part of Ser. No. 297,388, Aug. 28, 1981, abandoned. This application Jun. 3, 1988, Ser. No. 205,057

The portion of the term of this patent subsequent to Jul. 29, 2003, has been disclaimed.

Int. Cl.[4] A61K *31/20, 31/41*

U.S. Cl. 514—381 **11 Claims**

1. A method for retarding and reversing the loss of collagen fibers, abnormal changes in elastic fibers, and deterioration of small blood vessels in sundamaged human skin, comprising applying topically to the surface of the skin a composition comprising effective amounts of a retinoid in a nontoxic, dermatologically acceptable vehicle in a program of maintenance therapy, whereby the skin substantially regains and maintains its firmness, turgor and elasticity during said therapy, said composition and amounts of retinoid therein being selected so as to provide a dose for application which is insufficient to cause excessive irritation.

4,877,806

USE OF TRICYCLODECENE-3,4,7,8-TETRACARBOXYLIC ACID DERIVATIVES AS ANTI-MURINE TUMOR AGENTS

Ralph P. Neighbors, Olathe, and Joseph R. Riden, Overland Park, both of Kans., assignors to Chevron Research Company, San Francisco, Calif.

Continuation of Ser. No. 504,498, Jun. 15, 1983, abandoned, which is a continuation-in-part of Ser. No. 324,882, Nov. 25, 1981, abandoned, which is a continuation-in-part of Ser. No. 231,514, Feb. 4, 1981, abandoned. This application Mar. 18, 1988, Ser. No. 170,583

Int. Cl.[4] A61K *31/40*

U.S. Cl. 514—410 **2 Claims**

1. A method of treating mammals afflicted with murine tumors comprising administering to said mammals in a therapeutically effective amount sufficient to increase survival time or inhibit tumor growth the diimide of tricyclo[4.2.2.$0^{2,5}$]dec-9-ene-3,4,7,8-tetracarboxylic acid or a pharmaceutically acceptable salt thereof.

4,877,807

5-PHENYL-1,2,3A,4,5,9B-HEXAHYDRO-3H-BENZ(E)INDOTES PREPARATION AND USE THEREOF AS DRUGS

Gerd Steiner, Kirchheim; Walter Himmele, Walldorf; Ernst Buschmann, Ludwigshafen; Hans-Juergen Teschendorf, Dudenhofen, and Harald Weifenbach, Ludwigshafen, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

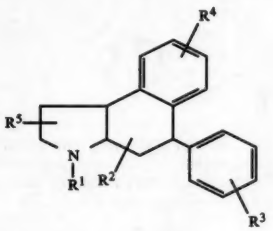
Filed May 23, 1988, Ser. No. 197,274

Claims priority, application Fed. Rep. of Germany, May 23, 1987, 3717395

Int. Cl.[4] A61K *31/40*; C07D *209/60, 207/06, 207/08*

U.S. Cl. 514—411 **13 Claims**

1. A 5-phenyl-1,2,3a,4,5,9b-hexahydro-3H-benz[e]indole of compound the formula I:



I

where R^1 is hydrogen or C_{1-6}-alkyl, R^2 is hydrogen or C_{1-3}-alkyl in the 3a- or 4-position, R^3 and R^4 are each hydrogen, hydroxyl, halogen, C_{1-3}-alkyl, C_{1-3}-alkoxy, C_{1-3}-alkylthio or trifluoromethyl, acetylamino or amino and R^5 is hydrogen or C_{1-3}-alkyl, or a salt thereof with a physiologically tolerated acid.

7. A pharmaceutical composition for treating depression or convulsive disorders in a patient or for imparting a sedative or tranquilizing effect to said patient, which comprises an effective amount of one or more compounds of claim 1 as an active substance and a pharmaceutically-acceptable carrier.

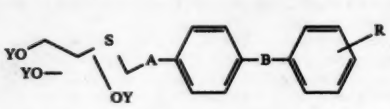
4,877,808
NOVEL β-D-PHENYLTHIOXYLOSIDES, THEIR METHOD OF PREPARATION AND THEIR USE AS THERAPEUTICS

Soth Samreth, Longvic; Francois Bellamy, Saulon la Chapelle, and Jean Millet, Saulon la Rue, all of France, assignors to Fournier Innovation et Synergie, Paris, France

Filed Apr. 25, 1988, Ser. No. 185,422
Claims priority, application France, May 4, 1987, 87 06237
Int. Cl.[4] A61K *31/38*; C07D *335/02*
U.S. Cl. 514—432 7 Claims

1. An oside derivative which is selected from the group consisting of:

(i) the β-D-phenylthioxylosides of the formula:



(I)

in which:

R represents a hydrogen atom, a halogen atom, a nitro group or a cyano group,

A represents the sulfur atom or the oxygen atom,

B represents a CH_2, CHOS or CO group, and

Y represents the hydrogen atom or an acyl group containing from 2 to 5 carbon atoms; and (ii) epimers thereof when B is CHOH.

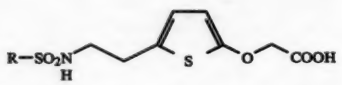
6. A therapeutic composition which contains, in association with a physiologically acceptable excipient, an amount, effective as an antithrombotic, of an oside derivative selected from the group consisting of the β-D-phenylthioxylosides of the formula I and epimers thereof according to claim 1.

4,877,809
NOVEL 2-THIENYLOXYACETIC ACID DERIVATIVES, A PROCESS FOR THEIR PREPARATION AND PHARMACEUTICAL PREPARATIONS CONTAINING THEM

Dieter Binder, Vienna; Franz Rovensky, Leitha, and Hubert P. Ferber, Ansfelden, all of Austria, assignors to CL Pharma Aktiengesellschaft, Linz, Austria

Filed Mar. 29, 1988, Ser. No. 174,883
Claims priority, application Austria, Apr. 3, 1987, 820/87
Int. Cl.[4] A61K *31/38*; C07D *409/00*
U.S. Cl. 514—444 6 Claims

1. A compound of the formula I



in which R denotes a phenyl or thienyl group which is optionally mono- or polysubstituted by halogen, trifluoromethyl or C_1–C_4 alkyl, or a pharmaceutically usable salt thereof.

4,877,810
PROTECTION OF HEART TISSUE FROM REPERFUSION INJURY

Donald A. G. Mickle, and Tai-Wing Wu, both of Toronto, Ontario, Canada, assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Feb. 5, 1988, Ser. No. 152,501
Int. Cl.[4] A61K *31/35*
U.S. Cl. 514—456 18 Claims

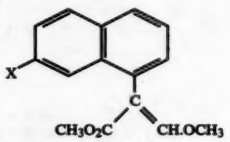
1. A method for protecting the heart of a mammal from tissue injury that is associated with reperfusion of an ischemic heart which method comprises introducing into the blood circulation of said mammal, in an amount effective to inhibit reperfusion injury, the chroman compound 6-hydroxy-2,5,7,8-tetramethyl-chroman-2-carboxylic acid.

4,877,811
CHEMICAL COMPOUNDS

Vivienne M. Anthony, Maidenhead; John M. Clough, Marlow, and Christopher A. Godfrey, Bracknell, all of United Kingdom, assignors to Imperial Chemical Industries PLC, London, Great Britain

Filed Nov. 12, 1987, Ser. No. 119,484
Claims priority, application Denmark, Nov. 11, 1986, 4972/85; United Kingdom, Dec. 3, 1986, 8628923
Int. Cl.[4] C07C *121/64, 69/76*; A01N *37/34, 37/36*
U.S. Cl. 514—522 6 Claims

1. A compound of the formula (V):



(V)

in which X is phenyl, unsubstituted or substituted with one or more of halogen, C_{1-4} alkyl, C_{1-4} alkoxy, phenyl, nitro and cyano.

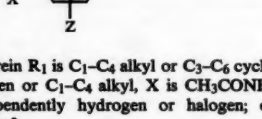
6. A method of killing or controlling insect and mite pests which comprises administering to the pest or a locus thereof an effective amount of a compound according to claim 1.

4,877,812
1-(ACETYLAMINOPHENYL)-2-AMINOPROPANONE DERIVATIVES AND ANTIDEPRESSANT COMPOSITIONS THEREOF

Louis Lafon, Paris, France, assignor to Laboratoire L. Lafon, Maisons Alfort, France

Continuation-in-part of Ser. No. 660,285, Oct. 12, 1984, abandoned. This application Apr. 16, 1987, Ser. No. 38,981
Claims priority, application France, Oct. 14, 1983, 83 16408; Aug. 20, 1984, 84 12963
The portion of the term of this patent subsequent to Oct. 8, 2002, has been disclaimed.
Int. Cl.[4] A61K *31/12*; C07C *87/28*
U.S. Cl. 514—630 7 Claims

1. A compound of the formula:



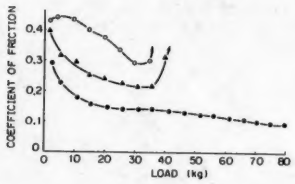
wherein R_1 is C_1–C_4 alkyl or C_3–C_6 cycloalkyl and R_2 is hydrogen or C_1–C_4 alkyl, X is CH_3CONH, and Y and Z are independently hydrogen or halogen; or an addition salt thereof.

7. A central nervous system antidepressant composition comprising an effective amount of the compound according to claim 1, or a non-toxic addition salt thereof, and a physiologically acceptable excipient.

4,877,813
BEARING RESIN MATERIAL

Osamu Jinno, Nagoya, and Tatsuhiko Fukuoka, Aichi, both of Japan, assignors to Taiho Kogyo Co., Ltd., Toyota, Japan

Division of Ser. No. 32,923, Mar. 30, 1987, Pat. No. 4,737,539.
This application Mar. 2, 1988, Ser. No. 162,923
Claims priority, application Japan, Oct. 22, 1984, 59-220400
The portion of the term of this patent subsequent to Apr. 12, 2005, has been disclaimed.
Int. Cl.[4] C08L 69/00
U.S. Cl. 525—146 8 Claims

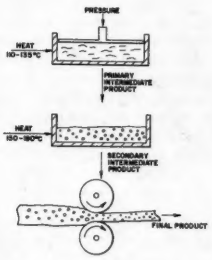


1. A resinous bearing material consisting essentially of at least one thermoplastic resin selected from the group consisting of polyacetal, polyamide, polycarbonate, polyphenylene sulfide, polyethylene terephthalate, and ultra-high molecular weight polyethylene, having 0.05 to 15% by weight of short, unentangled fibers of an aromatic polyamide uniformly distributed therein.

4,877,814
PROCESS FOR PRODUCING OPEN-CELL POLYETHYLENE FOAM MATERIALS AND THE RESULTANT PRODUCT

Hiroo Ito, Kyoto, Japan, assignor to Kabushiki Kaisha Serutekuno, Kyoto, Japan

Filed Sep. 5, 1986, Ser. No. 304,385
Claims priority, application Japan, Sep. 6, 1985, 60-198099; Sep. 17, 1985, 60-205795
Int. Cl.[4] C08J 9/06; B29C 59/04, 67/22
U.S. Cl. 521—79 7 Claims



1. A method for producing polyethylene open-cell foam materials whose characteristic feature is that it comprises:

(i) a first process step of compacting a base compound into a tightly closed mold in a press at a pressure of about 3kg/cm^2 to about 10 kg/cm^2 which is heated at a temperature of approximately 110° to 135° C., said base compound comprising polyethylene or copolymer of polyethylene which has been compounded with an azodicarbonamide foaming agent and a cross-linking agent in order to obtain a primary intermediary product wherein said foaming agent and said cross-linking agent have a decomposition ratio of from about zero to about 4% to provide a cubical expansion coefficient of 1.0 to 2.0 times.

(ii) a second process step of heating said primary intermediary product under normal pressure at a temperature of 150 ° to 190° C., thus causing the complete decomposition of said foaming agent and said cross-linking agent in order to obtain a secondary intermediate product having uniform cell membrane capable of being easily ruptured by mechanical compression; and

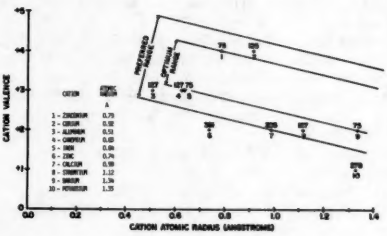
(iii) a third process step of mechanically compressing said secondary intermediate product to rapture said cell membranes and thereby interconnect said cells and thus obtain open-cell foam products, said open-cell foam products having expansion ratios greater than about 25.

7. A polyethylene open-cell foam material produced by the method set forth in claim 1.

4,877,815
NUCLEATING AGENTS FOR THERMOPLASTIC RESINS

Marlin D. Buckmaster, Vienna, W. Va., and Stuart K. Randa, Wilmington, Del., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Feb. 17, 1989, Ser. No. 312,989
Int. Cl.[4] C08J 9/00
U.S. Cl. 521—85 5 Claims



1. In an improved process for producing a foam of a thermoplastic resin composition, the improvement characterized in that the process is carried out with an effective amount of the nucleating agent of the formula

$$[Z(CF_2)_x(CF_2CFX)_p(R')_y(CH_2)_zRO_3]_nM$$

wherein:

Z is CCl_3, CCl_2H, H, F, Cl or Br;

each X, independently, is selected from H, F or Cl;

R is sulfur or phosphorus;

M is H or a metallic, ammonium, substituted ammonium or quaternary ammonium cation;

x is an integer and is 0 to 10;

p is an integer and is 0 to 6;

y is 0 or 1;

z is an integer and is 0 to 10;

x+y+z+p is a positive integer or, if x+y+z+p is 0, Z is CCl_3 or CCl_2H;

n is the valence of M; and

R' is a C_{1-16} straight or branched chain perfluoroalkylene diradical containing a perfluorinated alicyclic ring; a C_{1-16} perfluorinated aliphatic polyether diradical with repeat units selected from $[CF_2O]$, $[CF_2CF_2O]$ and $[CF_2CF(CF_3)O]$; or, when z is 0, an aromatic diradical;

so as to produce a foam having uniformity of cell size, small cell size, and high void content.

4,877,816

DEODORANT AND ANTIBACTERIAL FOAMED POLYMER AND SHEET

Katsuyoshi Murabayashi, Sakai, and Katsuyoshi Mitani, Amagasaki, both of Japan, assignors to Daicel Chemical Industries, Ltd., Osaka, Japan

Filed Dec. 22, 1987, Ser. No. 136,778

Claims priority, application Japan, Dec. 24, 1986, 61-313866; Dec. 24, 1986, 61-313867

Int. Cl.[4] C08J 9/00

U.S. Cl. 521—92 9 Claims

1. A foamed polymer composition which comprises 100 parts by weight of a foamed polymer which comprises a foamed polyurethane, polyethylene, polypropylene or polystyrene, 3 to 30 parts by weight of fine particles of a deodorant which comprises basic zinc carbonate or ferrous sulfate monohydrate and 0.2 to 2 parts by weight of fine particles of an antibacterial agent which comprises N-(fluorodichloromethylthio)-phthalamide or N,N-dimethyl-N'-phenyl-N'-(fluorodichloromethylthio)-sulfamide, wherein the deodorant and the antibacterial agent fine particles are insoluble or difficulty soluble in water and wherein the fine particles of the deodorant and the antibacterial are sufficiently small in size, such that said fine particles will at least pass through a sieve having 30 mesh according to JIS.

4,877,817

CHLORINATED RUBBER

Tetsuo Tojo; Takashi Nakahara; Yasuhiko Otawa, all of Ichihara, and Katsuo Okamoto, Funabashi, all of Japan, assignors to Mitsui Petrochemical Industries, Ltd., Tokyo, Japan

Division of Ser. No. 133,425, Dec. 15, 1987, Pat. No. 4,814,390, which is a division of Ser. No. 924,869, Oct. 30, 1986, Pat. No. 4,764,564. This application Dec. 21, 1988, Ser. No. 287,066

Claims priority, application Japan, Oct. 31, 1985, 60-242716

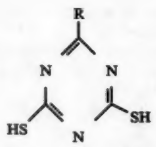
Int. Cl.[4] C08F 6/00

U.S. Cl. 521—142 3 Claims

1. A vulcanizable and foamable chlorinated rubber composition comprising

(A) a chlorinated rubber having a chlorine content of 10 to 45% by weight based on the weight of the chlorinated rubber and a Mooney viscosity, ML_{1+4} (121° C.), of 10 to 190, said chlorinated rubber being obtained by chlorinating an ethylene/alpha-olefin/vinylnorbornene copolymer rubber containing ethylene units and units of an alpha-olefin having 3 to 14 carbon atoms in a mole ratio of from 50:50 to 95:5 and 3 to 30 millimoles, per 100 g of the ethylene units and the alpha-olefin units combined, of 5-vinyl-2-norbornene units,

(B) a triazine compound represented by the general formula



wherein R is R^1R^2N—, R^1O—, R^1S or

in which R^1 and R^2 each represents a hydrogen atom, a C_1–C_{20} alkyl group, a C_6–C_{20} aryl group, a substituted C_1–C_{20} alkyl group or a substituted C_6–C_{20} aryl group, and

(C) a chemical blowing agent.

4,877,818

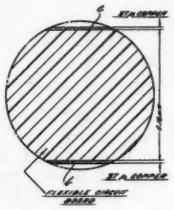
ELECTROPHORETICALLY DEPOSITABLE PHOTOSENSITIVE POLYMER COMPOSITION

William D. Emmons, Huntingdon Valley, and Mark R. Winkle, Lansdale, both of Pa., assignors to Rohm and Haas Company, Philadelphia, Pa.

Continuation of Ser. No. 842,323, Mar. 21, 1986, abandoned, which is a division of Ser. No. 654,821, Sep. 26, 1984, Pat. No. 4,592,816. This application Jan. 11, 1988, Ser. No. 142,110

Int. Cl.[4] G03C 5/00; C08F 220/34, 220/64, 265/06

U.S. Cl. 522—26 9 Claims



1. An aqueously developable, negative acting, electrophoretically depositable photoresist consisting essentially of an aqueous solution or emulsion of at least one polymer, free of ethylenic unsaturation, having less than about 200 milliequivalents of carrier groups per 100 grams of said polymer or polymers, said carrier groups being selected from the group consisting of amines or carboxylic acids, an effective amount of an acid or base for the neutralization of said amine or carboxylic acid carrier groups, respectively, to charged carrier groups such that said polymer or polymers contain from at least 10 milliequivalents to about 50 milliequivalents of charged carrier groups per 100 grams of said polymer or polymers, a photoinitiator, and an unsaturated crosslinking monomer, and where said photoresist can be anaphoretically or cataphoretically deposited, depending on the charge of said carrier groups on said polymer, as an adherent uniform film on a conductive surface, and where after exposure of selected portions of said film to actinic radiation, said unexposed portions of said photoresist film are capable of being removed by development with an aqueous solution of a weak organic acid, in the case of a cataphoretically deposited photoresist, or an aqueous base solution, in the case of an anaphoretically deposited photoresist, and where the exposed portions of said photoresist film remain resistant to oxidizing agents used to etch said conductive surface, and where said exposed photoresist film portions can be stripped from said surface using an aqueous solution.

4,877,819

PROCESS FOR PRODUCING POLYESTER RESIN COMPOSITION

Kazuto Kiyohara; Toshiyuki Hagiwara; Takanori Nakadate; Ichiya Harada, all of Hino; Kentaro Noguchi, Hofu; Shigeru Sakae, Hofu, and Kazuhiro Okuma, Hofu, all of Japan, assignors to Konica Corporation and Kanebo Ltd., both of, Japan

Filed Apr. 21, 1988, Ser. No. 184,390

Claims priority, application Japan, Apr. 23, 1987, 62-100917

Int. Cl.[4] C08K 9/02, 3/22

U.S. Cl. 523—200 8 Claims

1. A process for producing a polyester resin composition by first supplying a polyester resin and titanium dioxide into a continuous kneading extruder, kneading them in molten state, and supplying an additional charge of the polyester resin to

give a desired concentration of the titanium dioxide, wherein the first supplied polyester resin has an intrinsic viscosity of at least 0.40, said titanium dioxide having an average particle size of 0.1–0.5 μm and a water content of no more than 0.5% and having been surface-treated with an aluminum compound and/or a silicon compound, and the concentration of titanium dioxide being in the range of 20–70 wt % when kneaded with the polyester resin in molten state.

4,877,820

CROSS-LINKED ORGANOSILOXANE POLYMERS

Patrick J. Cowan, Wilmington, Del., assignor to Hercules Incorporated, Wilmington, Del.

Continuation-in-part of Ser. No. 28,430, Mar. 20, 1987, abandoned. This application Aug. 4, 1988, Ser. No. 228,083

Int. Cl.[4] C08K 7/02; C08G 77/06

U.S. Cl. 523—222 24 Claims

1. A cross-linked or hydrosilation cross-linkable linear poly(organohydrosiloxane) polymer having at least 30% of its ≡Si—H groups reacted with hydrocarbon residues derived from polycyclic polyenes selected from the group consisting of unsubstituted or substituted cyclopentadiene oligomers, norbornadiene, norbornadiene dimer and dimethanohexahydronaphthalene.

4,877,821

STABILIZER CONCENTRATE

Mark J. Hall; Joseph R. Powers, both of Midland, Mich., and William A. Wood, Chicago, Ill., assignors to The Dow Chemical Company, Midland, Mich.

Continuation-in-part of Ser. No. 19,169, Feb. 26, 1987, abandoned. This application Feb. 11, 1988, Ser. No. 154,776

Int. Cl.[4] C08J 3/22

U.S. Cl. 523—351 6 Claims

1. An improved process for stabilizing a polymeric blend composition containing a vinylidene chloride interpolymer and at least one other polymer, which process comprises forming an intimate admixture of the polymeric blend composition and a stabilizing concentrate which stabilizing concentrate contains a blend of: (1) a carrier resin, and (2) a stabilizing agent capable of stabilizing the vinylidene chloride interpolymer, said stabilizer concentrate having a viscosity of less than 60 percent of the viscosity of the polymeric blend composition.

4,877,822

EPOXY RESIN COMPOSITION

Kunio Itoh; Toshio Shiobara; Koji Futatsumori; Kazutoshi Tomiyoshi, and Hisashi Shimizu, all of Annaka, Japan, assignors to Shin-Etsu Chemical Co., Ltd., Tokyo, Japan

Continuation-in-part of Ser. No. 916,934, Oct. 7, 1986, abandoned. This application Apr. 8, 1988, Ser. No. 179,538

Claims priority, application Japan, Oct. 7, 1985, 60-224210; Oct. 7, 1985, 60-224211

Int. Cl.[4] C08L 63/02, 63/04

U.S. Cl. 523—433 6 Claims

1. An epoxy resin composition which comprises a curable epoxy resin, an epoxy resin agent, an inorganic filler, and a copolymer obtained by an addition reaction between aromatic polymers having one or more epoxy groups and one or more alkenyl groups and organopolysiloxanes of the following formula (1)

$$H_aR_bSiO_{\frac{4-(a+b)}{2}} \quad (1)$$

in which R represents a substituted or unsubstituted monovalent hydrocarbon group, "a" is a value of from 0.01 to 0.1, "b" is a value of from 1.8 to 2.2 and $1.81<a+b<2.3$, and the number of silicon atoms in a molecule is an integer of from 20 to 400 and the number of hydrogen atoms directly connected to silicon atoms is an integer of from 1 to 5.

4,877,823

FIREPROOFED THERMOPLASTIC MOLDING MATERIALS CONTAINING RED PHOSPHORUS AND BASED ON POLYESTERS OR POLYAMIDES

Christoph Plachetta, Limburgerhof; Graham E. McKee, Weinheim, and Hans-Peter Weiss, Mutterstadt, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Filed Apr. 19, 1988, Ser. No. 183,095

Claims priority, application Fed. Rep. of Germany, Apr. 24, 1987, 3713746

Int. Cl.[4] C08K 3/32

U.S. Cl. 524—80 14 Claims

1. A fireproofed thermoplastic molding material, which contains red phosphorus as a flameproofing agent and which is obtainable by mixing:

(a) from 5–95% by weight of a polyamide or a polyester or a combination thereof,

(b) from 5–95% by weight of an elastomer dispersion containing, an essential components:

(i) from 5–75% by weight of an elastomer prepared by emulsion polymerization,

(ii) from 10–70% by weight of red phosphorus,

(iii) from 10–80% by weight of water, and

(iv) from 0.1–5% by weight of a dispersing agent capable of dispersing said elastomer, and

(c) from 0–60% by weight of fibrous or particulate fillers or a mixture thereof, wherein the total content of red phosphorus in the molding material is from 3–20% by weight, based on the total weight of the molding material, said elastomer composition being introduced into a melt of the polyamide or of the polyester or a combination thereof.

4,877,824

SULFUR-CONTAINING COMPOUNDS AS ANTIOXIDANTS FOR LUBRICANTS AND ELASTOMERS

Samuel Evans, Marly, Switzerland, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

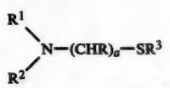
Continuation of Ser. No. 173,841, Mar. 28, 1988, abandoned. This application Jan. 25, 1989, Ser. No. 302,053

Claims priority, application Switzerland, Apr. 8, 1987, 1351/87

Int. Cl.[4] C08K 5/47, 5/36; C07C 149/243; C07D 249/10, 241/46, 219/62, 209/86

U.S. Cl. 524—83 8 Claims

1. A compound of the formula (I)



(I)

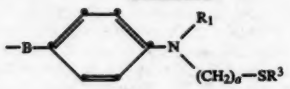
in which the Rs independently of one another are H, phenyl, naphthyl or C_7–C_{30}alkaryl and R^1 is H, C_1–C_8alkyl, C_7–C_9aralkyl, C_5–C_{12}cycloalkylphenyl, naphthyl, C_7–C_{30}alkaryl or a group of the formula (II)

$$-(CH_2)_a-SR^3 \quad (II)$$

R^2 is C_7–C_{30}alkaryl, phenyl, naphthyl or phenyl containing an HO of C_1–C_{18}alkoxy group or a group of the formulae

or

-continued



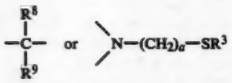
in the para-position, or R^1 and R^2, together with the nitrogen atom to which they are attached, are a radical of the formula (III)

(III)

R^3 is a radical of the formulae $-(CH_2)_b-COOR^6$ or $-(CH_2)_2OCOR^7$, a is the number 1, 2 or 3 and b is the number 1 or 2, and R^4 is phenyl or a group of the formula (II), the two R^5s independently of one another are H, C_1–C_{24}alkyl, C_5–C_{12}cycloalkyl or C_7–C_9aralkyl, and $R^{6,4}$ is H, C_1–C_{24}-alkyl or benzyl, R^7 is C_1–C_{14}alkyl, phenyl or a group of the formula

$$-(CH_2)_m-Y-(CH_2)_m-COO(CH_2)_2-S-(CH_2)_aN(R^1)(R^2)$$

in which Y is —O— or —S—, a is the number 1, 2 or 3 and m is the number 1 or 2, B is a direct bond, —S—, —S—S— or a C_1–C_{12}alkylene radical, X in the formula (III) is a direct bond, —S— or a group of the formulae



in which a and R^3 are as defined above, and R^8 and R^9 independently of one another are H, C_1–C_8alkyl or phenyl.

4,877,825

ELASTHANE FIBERS STABILIZED AGAINST ENVIRONMENTAL INFLUENCES

Michael Kausch, Cologne; Hans-Josef Buysch, Krefeld; Hans Schröer, Dormagen, and Carlhans Süling, Odenthal, all of Fed. Rep. of Germany, assignors to Bayer Akteingesellschaft, Leverkusen, Fed. Rep. of Germany

Continuation of Ser. No. 111,859, Oct. 23, 1987, abandoned. This application Mar. 10, 1989, Ser. No. 323,042

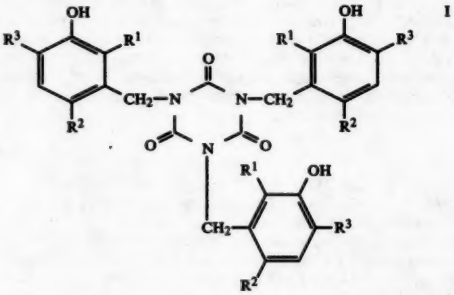
Claims priority, application Fed. Rep. of Germany, Nov. 4, 1986, 3637509

Int. Cl.[4] C08K *5/34, 5/53*

U.S. Cl. 524—101 **9 Claims**

1. Elasthane filaments or fibers comprising at least 85%, by weight, segmented polyurea polyurethanes of aromatic diisocyanates containing a phenolic antioxidant and a phosphite stabilizer, in which:

(a) the phenolic antioxidant corresponds to the following formula



I

in which

R^1, R^2 and R^3 are each independently C_1–C_3 alkyl radicals, in addition to which R^3 may represent C_4–C_6 alkyl radicals

and

(b) the phosphite stabilizer is an oligomeric, (cyclo)aliphatic phosphorous acid ester obtained by reaction of pentaerythritol and perhydrobisphenol A with a monomeric trialkyl or triarylphosphite, optionally in the presence of monoalcohol.

4,877,826

WEATHERABLE STYRENIC POLYMER BLEND COMPRISING POLYALKYLENE GLYCOL

Douglas E. Beyer, Midland, Mich., assignor to The Dow Chemical Company, Midland, Mich.

Filed Oct. 5, 1988, Ser. No. 254,176

Int. Cl.[4] C08K *5/06*

U.S. Cl. 524—377 **20 Claims**

1. A method of stabilizing a weatherable molding resin comprising (a) a matrix comprising a copolymer of styrene, acrylonitrile and from 0 to 50 weight percent methylmethacrylate, N-phenylmaleimide, N-C_{1-4} alkyl maleimide, maleic anhydride or mixtures thereof and (b) an impact modifying quantity of a grafted EPDM rubber, grafted alkylacrylate rubber or a mixture thereof, the method comprising incorporating into the resin an amount of a polyalkylene glycol having a molecular weight from 200 to 2,000, said amount being sufficient to plasticize said molding resin and to reduce resin discolorization upon exposure to weathering conditions.

4,877,827

POLYMER COMPOSITION, A PROCESS FOR PRODUCING A POLYMER COMPOSITION, AND THE USE OF SUCH A POLYMER COMPOSITION

Lambertus A. Van Der Groep, Gersthove 33,, 1112 HN Diemen, Netherlands

Filed Mar. 14, 1988, Ser. No. 167,697

Claims priority, application Netherlands, Mar. 13, 1987, 8700606; May 20, 1987, 8701208

Int. Cl.[4] C08L *23/20, 23/16, 23/08, 31/04*

U.S. Cl. 524—477 **12 Claims**

1. A polymer composition comprising a chemical reaction product obtained by high shear reacting at a temperature of at least 150° C. a mixture consisting essentially of:

(a) 30–70 parts by weight of one or more ethylenepropylenediene rubbers,

(b) 30–70 parts by weight of one or more ethylenevinyl acetate copolymers with a vinyl acetate content of 18–40% by weight,

(c) 1 to 25 parts by weight of at least one ethylene-olefin-1 copolymer, the olefin-1 containing 4, 5 or 6 carbon atoms, and

(d) optionally, 1–25 parts by weight of at least one other

polymer, with the priviso that the sum of (c) and (d), if any, is 1–25 parts by weight.

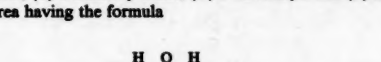
4,877,828

SELF-BONDING SILICONE CAULKING COMPOSITIONS

Judith Stein, Schenectady, and Tracey M. Leonard, Clifton Park, both of N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed May 31, 1988, Ser. No. 200,478
Int. Cl.[4] C08K 5/21
U.S. Cl. 524—728 3 Claims

1. Silicone caulking composition comprising (A) a base formulation having 40 to 60% solids comprising a silanol terminated polydimethylsiloxane having a molecular weight of about 5000 to 15,000 stabilized with nonionic surfactant and having a pH in the range of 4 to 6, (B) a calcium carbonate filler, (C) a trialkoxy silane, (D) a tin catalyst and (E) a bissilyl urea having the formula



where the bissilyl urea is present in the silicone caulking composition at from 0.1 to 5 parts per 100 parts of the base formulation, R, R^1 and R^2 are selected from the same or different $C_{(1-8)}$ alkyl radicals, and R^4 and R^5 are selected from the same or different $C_{(2-4)}$ divalent alkylene radicals,

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4,877,829

LIQUID COATINGS FOR BRIDGE DECKINGS AND THE LIKE

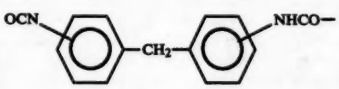
Cung Vu, Gaithersburg, Md.; Timothy J. Martin, Loxwood, England; Andrew M. Gillanders, Finchampstead, England, and Bassam Sbaiti, Burnham, England, assignors to W. R. Grace & Co.-Conn., Columbia, Md.

Filed May 19, 1988, Ser. No. 209,406
Int. Cl.[4] C08L 75/04
U.S. Cl. 524—729 34 Claims

1. Composition consisting essentially of two separate components, A and B;

Component A consisting essentially of, in parts by weight, (i) about 90 – 140 parts of castor oil; (ii) a low molecular weight polyol having at least 3 hydroxyl groups and a molecular weight between 92 and about 200, 2 – 10 parts; and (ii) an elastomer, about 0 – 120 parts;

Component B, about 40 – 120 parts; being a polyisocyanate of the group consisting of (i) isomers of diphenylmethane diisocyanate and (ii) a mixture of diphenylmethane diisocyanate and the reaction product of diphenylmethane diisocyanate with an alkylene oxide adduct of a polyol, – PAPI ®94. PAPI-94 is a mixture, consisting essentially of about 60-70% (i) and about 30-40% (ii), wherein (i) is a mixture of two MDI isomers, viz., about 88% of 4,4'-diphenylmethane diisocyanate and about 12% 2,4'-diphenylmethane diisocyanate; and (ii) is polymeric MDI, viz.,



having a functionality of 2.3, wherein n is a variable in the range of 1 to 3.

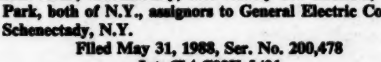
4,877,830

METAL CHELATE RESINS

Heinz Döbeli, Ziefen, and Frich Hochuli, Arlsdorf, both of Switzerland, assignors to Hoffmann-La Roche Inc., Nutley, N.J.

Filed Jul. 13, 1987, Ser. No. 72,452
Int. Cl.[4] C07C 101/24; C07K 3/20; B01J 20/32
U.S. Cl. 525—54.3 6 Claims

1. A metal chelate resin of the formula:



wherein X=2–4.

4,877,831

POLYCARBONATE RESIN COMPOSITION

Masafumi Hongo; Hideyuki Shigemitsu, both of Otake; Naoki Yamamoto, Hiroshima, and Akira Yanagase, Otake, all of Japan, assignors to Mitsubishi Rayon Co., Ltd., Tokyo, Japan

Filed Jun. 16, 1987, Ser. No. 62,604
Claims priority, application Japan, Jun. 17, 1986, 61-140636; Jul. 16, 1986, 61-165537
Int. Cl.[4] C08L 69/00, 51/08
U.S. Cl. 525—63 10 Claims

1. A pclycarbonate resin composition comprising either a polycarbonate resin (A) or a mixture (A') of the polycarbonate resin and one of a saturated polyester, a polyester elastomer, or both a saturated polyester and a polyester elastomer and either a siloxane-based graft polymer (B) obtained by graft polymerization of 95 to 10% by weight of at least one vinyl monomer onto 5 to 90% by weight of a polyorganosiloxane rubber

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4,877,832

THERMOSET RESIN COMPOSITIONS

Adrian Cassols; John C. Kwok; Keith J. Robinson; Brian H. A. Smith, all of Sarnia, Canada, and Michel Longuet, Strasbourg, France, assignors to Polysar Limited, Sarnia, Canada

Continuation-in-part of Ser. No. 942,259, Oct. 29, 1986, abandoned. This application Jan. 13, 1988, Ser. No. 143,322
Int. Cl.[4] C08L 67/06
U.S. Cl. 525—64 6 Claims

1. A molding composition suitable for preparing an impact resistant thermoset having good surface appearance, said composition comprising:

(a) 30–65 parts by weight of an unsaturated polyester, and correspondingly

(b) 70–35 parts by weight of a first monomer composition, said monomer composition being copolymerizable with said unsaturated polyester and consisting of at least one ethylenically unsaturated monomer,

(c) a polymerization initiator, and

(d) a partially polymerized additive, said additive consisting of the polymerization product of a dispersion consisting of:

(i) between 97 and 85 weight per cent of a second monomer composition consisting of at least one styrenic monomer, and correspondingly

(ii) between 3 and 15 weight per cent of a single, solid emulsion polymerized acrylonitrile-butadiene copolymer elastomer,

and wherein said single, solid elastomer is dispersed within said second monomer composition,

and wherein said additive is prepared according to the process whereby said dispersion is polymerized such that the extent of conversion of said second monomer composition is betwen 10 and 90 percent,

and wherein said additive is present in a quantity sufficient to provide between 1.5 and 10 parts by weight of said single, solid elastomer per 100 parts combined weight of said polyester plus said first monomer composition, character-

ized in that said molding composition does not contain more than one elastomer.

4,877,833

HEAT RESISTANT COPOLYMER COMPOSITION

Masatsune Kondo; Kiyoshi Ogura, and Koiti Kuramoto, all of Niihama, Japan, assignors to Sumitomo Naugatuck Co., Ltd., Osaka, Japan

Filed Nov. 6, 1987, Ser. No. 117,561
Claims priority, application Japan, Nov. 12, 1986, 61-270521
Int. Cl.[4] C08L *51/04, 67/02, 69/04, 79/08*
U.S. Cl. 525—64 9 Claims

1. A heat resistant copolymer composition comprising:

5 to 95% by weight of a copolymer (I) which is obtainable by copolymerizing (A) a maleimide monomer (B) an aromatic vinyl monomer, (C) an unsaturated nitrile monomer, and 0% to 50% by weight of the total weight of (A), (B), (C), and (D) of (D) at least one other comonomer copolymerizable with (A), (B) and (C) in the presence of 0% to 80% by weight of the total weight of (A), (B), (C), (D) and (E) of (E) an elastomeric polymer and has an intrinsic viscosity of 0.3 to 1.2 dl/g, and

95 to 5% by weight of a copolymer (II) which is obtainable by copolymerizing (B) the aromatic vinyl monomer, (C) the unsaturated nitrile and 0 to 50% by weight of the total weight of (B), (C) and (D) of (D) at least one other comonomer copolymerizable with (B) and (C) in the presence of 0% to 80% by weight of the total weight of (B), (C), (D) and (E) of (E) an elastic polymer and has an intrinsic viscosity of 0.3 to 1.5 dl/g,

wherein the total weight percentage of the monomers (A) and (C) in the copolymer (I) per total weight of the monomers (A), (B), (C) and (D) in the copolymer (I) and the weight percentage of the monomer (C) in the copolymer (II) per total weight of the monomers (B), (C) and (D) in the copolymer (II) satisfy the following equation: (Said total weight percentage of the monomers (A) and (C) in copolymer (I))−(Said weight percentage of the monomer (C) in copolymer (II))= +40 to −15% by weight, and

wherein the intrinsic viscosities of the copolymers (I) and (II) satisfy the following equation: (The intrinsic viscosity of the copolymer(I))−(The intrinsic viscosity of the copolymer (II))= +0.5 to −1.2 dl/g, wherein all intrinsic viscosities refer to the intrinsic viscosity of the non-grafted polymers, when grafted polymers are present,

said copolymer (I) having a composition of the monomers (A), (B), (C) and (D) satisfying the following equations (1), (2), and (3) wherein (A), (B), (C) and (D) stand for the respective weights thereof:

$$\frac{(A)}{(A)+(B)+(C)+(D)} \times 100 = (F)$$

$$\frac{(B)+(C)}{(A)+(B)+(C)+D} \times 100 = (G) \quad (2)$$

$$\frac{(C)}{(B)+(C)} \times 100 = (H) \quad (3)$$

where (F) ranges from 1 to 60% by weight, (G) ranges from 99 to 40% by weight and (H) ranges from 5 to 45% by weight,

said copolymer (II) having a composition of the monomers (B) and (C) satisfying the following equation (4) wherein (B) and (C) stand for the respective weights thereof:

$$\frac{(C)}{(B)+(C)} \times 100 = (J) \quad (4)$$

where (J) ranges from 20 to 45% by weight.

4,877,834

LUBRICATING OIL CONTAINING A MANNICH BASE

Christopher S. Liu, Poughkeepsie; Donald J. Clarke, Cold Spring, and Larry D. Grina, Wappingers Falls, all of N.Y., assignors to Texaco Inc., White Plains, N.Y.

Division of Ser. No. 36,950, Apr. 10, 1987, Pat. No. 4,780,230.
This application May 6, 1988, Ser. No. 190,860
Int. Cl.[4] C08L *51/00*
U.S. Cl. 525—66 25 Claims

1. The method which comprises forming a reaction mixture containing (i) a graft polymer, having a carbon-carbon backbone polymer containing residual unsaturation bearing graft moieties derived from a graft monomer containing ethylenic unsaturation and an epoxide moiety, and (ii) a Mannich base formed by the reaction of an aldehyde, a primary or secondary amine, and a hindered phenol;

maintaining said reaction mixture at coupling reaction conditions thereby effecting coupling of said Mannich base through a nitrogen atom to an opened epoxide moiety of said graft monomer on said carbon-carbon backbone polymer; and

recovering said product polymer wherein said Mannich base is joined through a nitrogen atom to an opened epoxide moiety of said graft monomer on said carbon-carbon backbone polymer.

4,877,835

THERMOPLASTIC RESIN COMPOSITION

Yusuke Tsuda; Takashi Kurata; Yoshinobu Suzuki, and Yuji Yamamoto, all of Tokyo, Japan, assignors to Japan Synthetic Rubber Co., Ltd., Tokyo, Japan

Filed Sep. 8, 1988, Ser. No. 241,459
Claims priority, application Japan, Oct. 2, 1987, 62-249473
Int. Cl.[4] C08L *69/00*
U.S. Cl. 525—67 8 Claims

1. A thermoplastic resin composition comprising:

(A) 50 to 90% by weight of a rubber-modified styrene thermoplastic resin,

(B) 5 to 48 % by weight of an aromatic polyester, and

(C) 2 to 10% by weight of an aromatic polycarbonate;

wherein 10 to 60% by weight of α-methyl styrene is copolymerized in said rubber-modified styrene thermoplastic resin.

4,877,836

VISCOSITY INDEX IMPROVER AND COMPOSITION CONTAINING SAME

Robert B. Rhodes, Houston, Tex., assignor to Shell Oil Company, Houston, Tex.

Filed May 24, 1988, Ser. No. 198,542
Int. Cl.[4] C08L *53/02*; C10M *143/10, 143/12*
U.S. Cl. 525—89 30 Claims

1. A polymeric blend comprising a selectively hydrogenated asymmetric radial polymer having at least one polymeric arm containing one or more hydrogenated conjugated dioelfin monomer units and at least one arm which is a selectively hydrogenated diblock copolymer having a single polymeric block containing monoalkenyl aromatic hydrocarbon monomer units and a single polymeric block containing hydrogenated conjugated diolefin monomer units and a selectively hydrogenated linear diblock copolymer having a single polymeric block containing predominantly monoalkenyl hydrocarbon monomer units and a single polymeric block containing hydrogenated conjugated diolefin monomer units.

4,877,837

EPOXY FUNCTIONAL AND SILICONE THERMOSETTING POWDER COATINGS

John C. Reising, Avon, Ohio, and David E. Miles, Port Huron, Mich., assignors to The Glidden Company, Cleveland, Ohio

Filed Oct. 7, 1988, Ser. No. 254,617
Int. Cl.[4] C08F 8/00
U.S. Cl. 525—100 6 Claims

1. A thermosetting powder paint composition comprising on a weight basis:

between 40% and 70% glycidyl functional acrylic polymer blended with 30% to 60% solid cyclic silicone resin;

where said glycidyl acrylic polymer comprises copolymerized ethylenically unsaturated monomers of about 45% to 55% acrylic monomer, about 20% to 30% glycidyl functional monomer, with the balance being other ethylenically unsaturated monomer, said glycidyl acrylic polymer having a Tg above about 40° C. and a number average weight between about 2,500 and 3,000 as measured by GPC;

where the cyclic silicone resin has a Tg above about 50° C. and a molecular weight above about 600 where the cyclic silicone resin includes a cyclic silicone molecule having at least two hydroxyl groups and/or methylol groups per cyclic silicone molecule, and said cyclic silicone resin crosslinks with said glycidyl acrylic polymer upon heating to provide a thermosetting powder coating.

4,877,838

HIGH SOLIDS COATINGS WITH REACTIVE EPOXY ESTER DILUENT

Perry A. Toman, Medina, Ohio, assignor to The Glidden Company, Cleveland, Ohio

Continuation-in-part of Ser. No. 147,440, Jan. 25, 1988, Pat. No. 4,182,523. This application Dec. 23, 1988, Ser. No. 289,257
Int. Cl.[4] C08L 63/00
U.S. Cl. 525—107 13 Claims

1. A high solids, non-aqueous thermosetting paint coating composition based on a coreactive polymeric binder, the polymeric binder comprising on a weight basis:

between 5% and 50% low molecular weight, hydroxyl functional acrylic copolymer having a hydroxyl number between 50 and 200 and a number average molecular weight between about 500 and 2,500 as measured by GPC;

between 10% and 60% of a linear, low molecular weight hydroxyl functional polyester polymer having a hydroxyl number between 115 and 285 and a number average molecular weight between about 250 and 2,000 as measured by GPC;

between 5% and 60% of a hydroxy ester functional epoxy ester diluent;

between 20% and 40% aminoplast or glycoluril crosslinking component adapted to crosslink upon heating with said acrylic copolymer, said polyester, and said epoxy ester diluent.

4,877,839

FLUOROCOPOLYMER COMPOSITIONS

John N. Conti-Ramsden, Wilmington, Mass.; Richard L. Powell, Tarporley, England; Brian D. Young, Winsford, England; Jeffrey Farrar, Kelsall, England, and Debra K. Brown, South Wirral, England, assignors to Imperial Chemical Industries PLC, London, England

Filed Jun. 8, 1988, Ser. No. 203,848
Claims priority, application United Kingdom, Jun. 8, 1987, 8713362
Int. Cl.[4] C08L 27/16, 27/12, 27/22, 33/06
U.S. Cl. 525—200 14 Claims

1. Composition comprising at least one fluorocopolymer and at least one acrylic polymer, wherein said fluorocopolymer is a copolymer comprising polymerised units derived from:

(A) at least one fluoroolefine of formulate $CFX^1{=}CFX^2$ where X^1 is selected from F and halogen other than F and X^2 is selected from F, H, halogen other than F, and perfluoroalykyl; and

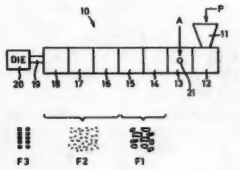
(B) at least one fluoroallylether of formula $CH_2CHCH_2OR_f$ where R_f is a fluoroalkyl group having 2 to 10 carbon atoms.

4,877,840

POLYOLEFIN CONCENTRATE

Kenneth C. Chu, Kingston, Canada, assignor to Du Pont Canada Inc., Mississauga, Canada

Filed Jan. 15, 1988, Ser. No. 144,232
Claims priority, application United Kingdom, Jan. 28, 1987, 87001914
Int. Cl.[4] B29C 35/02, 47/00, 67/02; C08L 23/04
U.S. Cl. 525—240 2 Claims



1. Strands or pellets of polyisobutylene having a molecular weight from 300–15,000 in a polyolefin, in which the concentration of polyisobutylene in the strands or pellets is from 30–60 weight percent.

2. A crumble of polyisobutylene in a polyolefin in which the concentration of the polyisobutylene having a molecular weight of from 300–15,000 in the crumble is from 20–60 weight percent.

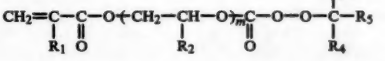
4,877,841

GRAFT POLYMERIZATION PREFORMER AND METHOD OF MANUFACTURING THE SAME

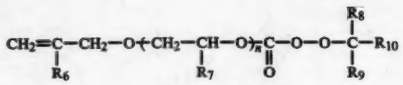
Yasuo Moriya; Nobuyoshi Suzuki, and Hiroshi Goto, all of Aichi, Japan, assignors to Nippon Oil and Fats Co., Ltd., Tokyo, Japan

Filed Jan. 29, 1988, Ser. No. 149,746
Claims priority, application Japan, Jan. 31, 1987, 62-21127; May 11, 1987, 62-114021; Aug. 10, 1987, 62-199612; Aug. 10, 1987, 62-199615; Aug. 10, 1987, 62-199618
Int. Cl.[4] C08F 255/02, 255/04, 255/06, 255/08
U.S. Cl. 525—286 18 Claims

1. A graft polymerization preformer obtained by copolymerizing in 100 parts by weight of ethylene homopolymer or copolymer or mixtures thereof, (a) 5 to 400 parts by weight of one or more vinyl monomers selected from a group consisting of vinyl aromatic monomers, acrylic or methacrylic ester monomers or mixtures thereof, acrylonitrile methacrylonitrile and vinyl ester monomers and (b) one or more radical polymerizable organic peroxides represented by a formula



where R_1 represents a hydrogen atom or an alkyl group with a carbon number of 1 to 2, R_2 a hydrogen atom or a methyl group, R_3 and R_4 respective alkyl groups with a carbon numbers of 1 to 4, R_5 an alkyl, phenyl or alkyl-substituted phenyl group with a carbon number of 1 to 12 or a cycloalkyl group with a carbon number of 3 to 12, and m is 1 or 2, or a formula



(II)

where R_0 represents a hydrogen atom or alkyl group with a carbon number of 1 to 4, R_7 a hydrogen atom or a methyl group, R_8 and R_9 represents alkyl groups with carbon number of 1 to 4, R_{10} an alkyl, phenyl or alkyl-substituted phenyl group with carbon number of 1 to 12 or cycloalkyl group with carbon number of 3 to 12, and n being 0, 1 or 2, said (b) being incorporated in 0.1 to 10 parts by weight with respect to 100 parts by weight of said vinyl monomer or monomers, said graft polymerization preformer containing 20 to 95% by weight of ethylene polymer and 80 to 5% by weight of vinyl copolymer, said vinyl copolymer containing 0.01 to 0.73% by weight of active oxygen.

4,877,842

DEMULSIFIER COMPOSITIONS AND METHODS OF PREPARATION AND USE THEREOF

Rudolf S. Buriks, St. Louis, Mo., and James G. Dolan, Granite City, Ill., assignors to Petrolite Corporation, St. Louis, Mo.

Filed Feb. 29, 1988, Ser. No. 161,863

Int. Cl.[4] B01D *17/04*; C09K *7/00*

U.S. Cl. 252—344 **6 Claims**

1. A method for demulsifying a water-in-oil emulsion comprising adding thereto a composition comprising the reaction product resulting from subjecting to grafting reaction conditions a mixture comprising a solvent, a polyoxyalkylene amine and a vinyl monomer to produce a grafted intermediate and subjecting said grafted intermediate to esterification reaction conditions to produce said reaction product, said mixture being substantially free of copolymers derived from a polyoxyalkylene glycol and a diglycidyl ether, the amount of said solvent in said mixture being such that said reaction product is suitable for use as a demulsifier, and said reaction product being partially cross-linked.

4,877,843

SELECTIVE HYDROLYSIS OF COPOLYMERS OF PARA-ACETOXY STYRENE AND ALLYL ESTERS OF ETHYLENICALLY UNSATURATED ACIDS

Balaram Gupta, North Plainfield, N.J., assignor to Hoechst Celanese Corporation, Somerville, N.J.

Filed Sep. 11, 1987, Ser. No. 99,430

The portion of the term of this patent subsequent to Aug. 25, 2004, has been disclaimed.

Int. Cl.[4] C08F *8/12*

U.S. Cl. 525—344 **17 Claims**

1. A process for preparing copolymers of p-vinylphenol and allyl esters of ethylenically unsaturated acids which comprises slurrying copolymers of p-acetoxystyrene and allyl esters of ethylenically, unsaturated acids in water or an alcohol followed by hydrolyzing the acetoxy groups with an acid or a base with substantially no saponification of the allyl ester groups.

4,877,844

PROCESS FOR PRODUCING A LOW GLOSS THERMOPLASTIC RESIN

Kazuo Kishida, Hiroshima; Yutaka Toyooka, and Yoshiyuki Mikami, both of Ohtake, all of Japan, assignors to Mitsubishi Rayon Company Limited, Tokyo, Japan

Continuation of Ser. No. 860,577, May 7, 1986, abandoned. This application Dec. 21, 1987, Ser. No. 135,470

Claims priority, application Japan, May 10, 1985, 60-98035; Aug. 26, 1985, 60-187113

Int. Cl.[4] C08F *279/04*

U.S. Cl. 525—316 **7 Claims**

1. A process for producing a low gloss thermoplastic resin, by emulsion polymerizing in two steps (A) 20 to 70 parts by weight of butadiene polymer having an average particle size of at least 0.05 μm and a gel content of at most 60% by weight, at least 70% by weight of which consists of butadiene, with (B) from 30 to 80 parts by weight of a total of (i) from 15 to 40% by weight of a vinyl cyanide monomer and (ii) from 60 to 85% by weight of an aromatic vinyl monomer, which process consists essentially of:

(a) reacting from 30 to 70% by weight of the entire butadiene polymer with from 30 to 70% by weight of the entire vinyl cyanide monomer and from 30 to 70% by weight of the entire aromatic vinyl monomer until a monomer conversion of at least 56% is obtained, thereby effecting grafting of the monomers to the butadiene polymer to form a latex; and then

(b) charging and reacting the remaining portions of the butadiene polymer, vinyl cyanide monomer and aromatic vinyl monomer, thereby effecting partial grafting of said monomers to the butadiene polymer, to render the formed partially grafted copolymer capable of agglomeration when heated, thereby imparting a low gloss to said thermoplastic resin.

4,877,845

CURE ACTIVATORS FOR NONHALOGENATED RUBBERS

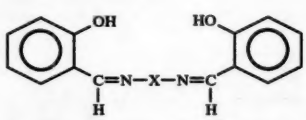
Carl R. Parks, Akron, and Donald J. Burlett, Wadsworth, both of Ohio, assignors to The Goodyear Tire & Rubber Company, Akron, Ohio

Division of Ser. No. 129,200, Dec. 7, 1987, Pat. No. 4,839,433. This application Jan. 13, 1989, Ser. No. 296,634

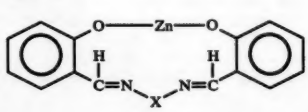
Int. Cl.[4] C08C *19/20*

U.S. Cl. 525—346 **7 Claims**

1. A method for enhancing the rate of sulfur vulcanization of a sulfur vulcanizable elastomer or blend of elastomer selected from the group consisting of natural rubber polybutadiene, polyisoprene, styrene/butadiene copolymers, terpolymers of acrylonitrile butadiene and styrene and blends thereof which comprises adding to said elastomer a compound or compounds of the structural formula:



and/or



(II)

wherein X is a radical of the structural formula:

wherein y can equal 0, 1, 2, or 3.

4,877,846
POLYALCOHOL HOMOPOLYMERS

Tze-Chiang Chung, Bridgewater, N.J., assignor to Exxon Research and Engineering Company, Florham Park, N.J.

Division of Ser. No. 520, Jan. 5, 1987, Pat. No. 4,812,529. This application Dec. 23, 1988, Ser. No. 288,755
Int. Cl.[4] C08F 8/00
U.S. Cl. 525—369 2 Claims

1. A process for the synthesis of a polyalcohol homopolymer which comprises the steps of:

(a) dissolving a polyborane homopolymer in a solvent; to form a polymeric solution;

(b) injecting an NaOH solution into said polymeric solution at about 25° C.;

(c) injecting a hydrogen peroxide solution into said polymeric solution at about 0° C. to about 25° C.;

(d) heating said polymeric solution to at least about 50° C.;

(e) maintaining said polymeric solution at least about 50° C. for at least about 2 hours to form said polymeric homopolymer;

(f) cooling said polymeric solution to about room temperature; and

(g) precipitating said polyalcohol homopolymer from said polymeric solution by the addition of an aliphatic hydrocarbon to said polymer solution.

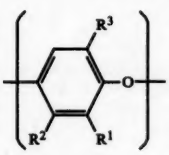
4,877,847
POLYPHENYLENE ETHER RESIN COMPOSITION

Masanobu Masu, Toyonaka; Hiroshi Yoshioka, Tokyo; Kenzi Kouno, Toyonaka; Isao Nomura, Hiratsuka, and Kazuo Yamamiya, Chigasaki, all of Japan, assignors to Mitsubishi Gas Chemical Company, Inc., Tokyo, Japan

Filed Sep. 10, 1987, Ser. No. 94,884
Claims priority, application Japan, Sep. 10, 1986, 61-211480; Mar. 24, 1987, 62-68096; Mar. 24, 1987, 62-68097
Int. Cl.[4] C08G 65/48, 71/04, 77/10
U.S. Cl. 525—397 1 Claim

1. A polyphenylene ether resin composition comprising

(A) a polyphenylene ether resin modified with a 1,2-substituted olefin compound having an acid anhydride group, the polyphenylene ether resin before modification having structural units represented by the following formula (I)



(I)

wherein R^1 represents a lower alkyl group having 1 to 3 carbon atoms, and R^2 and R^3, independently from each other, represent a hydrogen atom or a lower alkyl group having 1 to 3 carbon atoms, in the main chain, and

(B) a polyamide resin having recurring units represented by the following formula (II)

$$—R^4—NHCO—R^5—CONH— \quad (II)$$

wherein R^4 represents a xylylene group, and R^5 represents a linear alkylene group having 4 to 10 carbon atoms

the weight ratio of the polyphenylene ether resin (A) to the polyamide resin (B) being from 0.3 to 3.

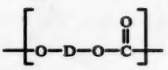
4,877,848
THERMOPLASTIC BLENDS CONTAINING POLYAMIDE AND EPOXY FUNCTIONAL COMPOUND

Louis M. Maresca, Pittsfield, Mass., assignor to General Electric Company, Pittsfield, Mass.

Continuation of Ser. No. 812,434, Dec. 23, 1985, abandoned. This application Mar. 14, 1989, Ser. No. 325,061
Int. Cl.[4] C08L 77/00
U.S. Cl. 525—423 6 Claims

1. A thermoplastic blend consisting essentially of:

(i) at least one aromatic polycarbonate resin, wherein the polycarbonate consists of recurring structural units of the formula:



wherein D is a divalent aromatic radical of a dihydric phenol;

(ii) at least one polyamide resin; and

(iii) an effective compatibilizing amount of at least one epoxy functional agent selected from the group consisting of aliphatic epoxides and cycloaliphatic epoxides.

4,877,849
OXYFORMYLATED SUBSTITUTED POLYBENZIMIDAZOLE ARTICLE

Joseph J. Rafalko, Chatham, N.J., assignor to Hoechst Celanese Corporation, Somerville, N.J.

Filed Aug. 17, 1987, Ser. No. 86,020
Int. Cl.[4] C08G 69/26
U.S. Cl. 525—433 31 Claims

1. A process for producing a substituted polybenzimidazole polymer which comprises the steps of:

(a) preparing a polybenzimidazole polymer solvent solution; and

(b) reacting the polybenzimidazole polymer with a pyrocarbonate to form an aryl or alkyl oxyformylated polybenzimidazole polymer.

4,877,850
BUFFER WASH OF POLYARYLENE SULFIDES

Jon F. Geibel, and Afif Nesheiwat, both of Bartlesville, Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.

Filed Feb. 22, 1988, Ser. No. 158,438
Int. Cl.[4] C08G 75/14
U.S. Cl. 525—471 62 Claims

1. A process for treating a particular virgin arylene sulfide resin to produce an uncured treated arylene sulfide resin having an increased cure rate comprising:

(a) preparing a slurry, wherein the solid component of said slurry comprises said particulate virgin arylene sulfide resin, and wherein the liquid component of said slurry comprises an aqueous buffer solution, wherein said buffer solution has a pH less than about 9.35 but greater than that necessary to result in curing of said virgin arylene sulfide resin,

(b) heating said slurry, while in the substantial absence of a gaseous oxidizing atmosphere, to an elevated temperature below the melting point of said virgin arylene sulfide resin, for a time sufficient to increase the cure rate of said particulate virgin arylene sulfide, and

(c) recovering the resulting treated particulate arylene sulfide resin from said slurry in a manner which does not result in curing of said treated particulate arylene sulfide resin.

4,877,851
BLENDS OF COPOLY(ARYLENE SULFIDE) AND POLY(ARYLENE SULFIDE)

David R. Fagerburg; Joseph J. Watkins, and Paul B. Lawrence, all of Kingsport, Tenn., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Jul. 25, 1988, Ser. No. 224,509
Int. Cl.[4] C08L *81/02*; C08G *75/14*
U.S. Cl. 525—537 **5 Claims**

1. A composition comprising an admixture of

(A) from 99.9 to 90 weight percent, based on the weight of the admixture, of a copoly(arylene sulfide) corresponding to the structure

$$[(-A-S)_{1-x}(-A-S-S)_x]_n$$

wherein A is a divalent substituted or unsubstituted aromatic radical, x is in the range of 0.5 to 0.001 and n is at least 200, and

(B) from 0.1 to 10 weight percent, based on the weight of the admixture, of a poly(arylene sulfide) corresponding to the structure

$$(-A-S-)_r$$

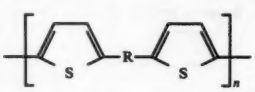
A is the same as above and where r is at least 25.

4,877,852
THIOPHENE DERIVATIVE POLYMER AND A POLYMER COMPOSITION THEREOF

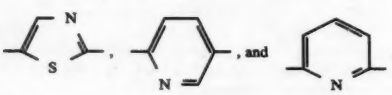
Susumu Tanaka; Masaaki Sato, both of Tsukuba; Kyoji Kariyama, Tsuchiura; Yoshio Suda, Hachioji, and Takao Hiraide, Tochigi, all of Japan, assignors to Agency of Industrial Science and Technology and Ministry of International Trade and Industry, both of Tokyo, Japan

Filed Feb. 12, 1988, Ser. No. 155,274
Claims priority, application Japan, Feb. 19, 1987, 62-36816
Int. Cl.[4] C08F *28/06*
U.S. Cl. 526—256 **4 Claims**

1. A thiophene derivative polymer comprising repeating units of the formula:



wherein n denotes a number within the range of about 10 to 500 and R represents a member selected from the group consisting of:



4,877,853
POLYMETHYL METHACRYLATE MOLDING COMPOUNDS

Werner Siol, Darmstadt; Ernst Heil, Stockstadt; Franz Wenzel, Darmstadt; Peter J. Arndt, Seeheim-Jugenheim, and Ulrich Terbrack, Reinheim, all of Fed. Rep. of Germany, assignors to Röhm GmbH, Darmstadt, Fed. Rep. of Germany

Continuation of Ser. No. 34,684, Apr. 6, 1987. This application Aug. 19, 1988, Ser. No. 235,707
Claims priority, application Fed. Rep. of Germany, Apr. 16, 1986, 3612791
Int. Cl.[4] C08F *120/18*
U.S. Cl. 526—329.7 **13 Claims**

1. A method for making a thermoplastically processable polymer which comprises emulsion polymerizing, in the absence of a dispersing agent, at least 80 percent by weight of methyl methacrylate monomer with up to 20 percent by weight of at least one other monomer copolymerizable therewith in an aqueous phase at a temperature from 0° C. 100° C. in the presence of a polymerization initiator and a chain transfer agent in a molar ratio from 1:2 to 1:100,000, said chain transfer agent being from 0.01 to 5 percent by weight of said monomers, to form a polymer latex wherein the polymer particles have a diameter from 50 to 2000 nanometers, and then separating said polymer and said aqueous phase.

4,877,854
CURABLE COMPOSITION

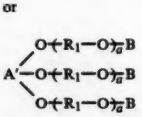
Norikazu Hattori, Sagamihara; Sunao Urabe, Yokohama, and Koshi Kusumoto, Kamakura, all of Japan, assignors to Tokuyama Soda Kabushiki Kaisha, Yamaguchi, Japan

Filed Dec. 7, 1987, Ser. No. 129,173
Claims priority, application Japan, Dec. 8, 1986, 61-290598; Aug. 7, 1987, 62-196377
Int. Cl.[4] C08G *77/06*
U.S. Cl. 528—15 **10 Claims**

1. A curable composition, which comprises (A) an unsaturated polyether represented by the formula:

$$BO\leftarrow R_1-O\rightarrow_a AO\leftarrow R_1-O\rightarrow_a B \quad (I)$$

or

 (I')

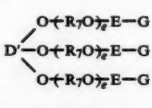
wherein A stands for a saturated hydrocarbon group having a valency of 2 and having 1 to 10 carbon atoms, A' stands for a saturated hydrocarbon group having a valency of 3 and having 3 to 10 carbon atoms, R_1 stands for a linear or branched alkylene group having 2 to 6 carbon atoms, with the proviso that if a is 2 or more, each R_1 may be the same or a different alkylene group and the polyether chain comprising units —O—R_1— can be in the form of a random polymer or a block polymer, a is an integer of from 1 to 300, and B stands for an unsaturated group represented by the formula

in which R_2, R_3, R_4, R_5 and R_6, which may be the same or different, stand for a hydrogen atom or an alkyl group having 1 to 10 carbon atoms and d is an integer of from 0 to 10, with the proviso that each B may be the same or a different group,

(B) a siloxane-substituted polyether represented by the formula:

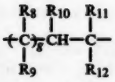
$$G-E-O\leftarrow R_7O\rightarrow_c DO\leftarrow R_7O\rightarrow E-G \quad (II)$$

or

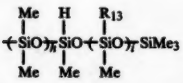
 (II')

wherein D stands for a saturated hydrocarbon group

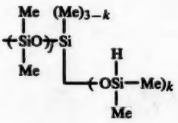
having a valency of 2 and having 1 to 10 carbon atoms, D' stands for a saturated hydrocarbon group having a valency of 3 and having 3 to 10 carbon atoms, R_7 stands for a linear or branched alkylene group having 2 to 6 carbon atoms, with the proviso that if e is 2 or more, each R_7 may be the same or a different alkylene group and the polyether chain comprising units —O—R_7— can be in the form of a random polymer or a block polymer, e is an integer of from 1 to 30, E stands for an alkylene group of the formula



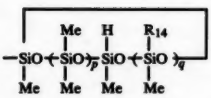
in which R_8, R_9, R_{10}, R_{11} and R_{12}, which may be the same or different, stand for a hydrogen atom or an alkyl group having 1 to 10 carbon atoms and g is an integer of from 0 to 10, with the proviso that each E may be the same or a different alkylene group, and G stand for a siloxane group selected from the group consisting of (i)



in which h and i are integers of from 0 to 8 satisfying the requirement of h+i=1 to 8, R_{13} stands for a hydrogen atom or a methyl group, with the proviso that if i is 2 or more, each R_{13} may be the same or a different group, and Me stands for a methyl group, (ii)



in which j is an integer of from 0 to 8, k is integer of from 1 to 3, with the proviso that j and k satisfy the requirement of j+k=1 to 9, and Me stands for a methyl group, and (iii)



in which p and q are integers of from 0 to 4 satisfying the requirement of p+q=1 to 4 and R_{14} has the same meaning as that of R_{13}, with the proviso that each G may be the same or a different siloxane group,

and (C) at least one catalyst selected from the group consisting of platinum, chloroplatinic acid and platinum complexes.

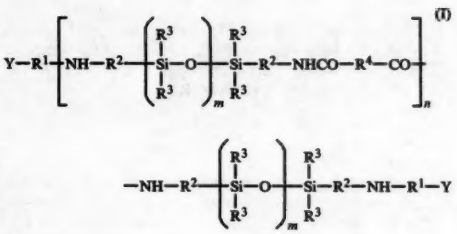
4,877,855

SILOXANE-AMIDE BLOCK COPOLYMER AND PROCESS FOR PRODUCING THE SAME

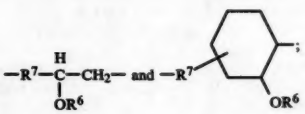
Hisayuki Nagaoka; Michio Zenbayashi, and Chiyuki Shimizu, all of Gunma, Japan, assignors to Toshiba Silicone Co., Ltd., Tokyo, Japan

Filed Aug. 5, 1988, Ser. No. 228,413
Claims priority, application Japan, Aug. 7, 1987, 62-197504
Int. Cl.[4] C08G 77/04
U.S. Cl. 528—26 6 Claims

1. A siloxane-amide block copolymer represented by formula (I):



wherein Y represents an organosilyl group containing a hydrolyzable group represented by formula $—SiR^5_aX_{3-a}$; R^1 represents a divalent group selected form the group consisting of



R^2 represents a substituted or unsubstituted divalent hydrocarbon group; R^3 represents a substituted or unsubstituted monovalent hydrocarbon group; R^4 represents a substituted or unsubstituted divalent aromatic hydrocarbon group; R^5 represents a substituted or unsubstituted monovalent hydrocarbon group; R^6 represents a hydrogen atom, the same substituted or unsubstituted monovalent hydrocarbon group as represented by R^3 or an organosilyl group represented by formula $—SiR^8_bX_{3-b}$; R^7 represents a substituted or unsubstituted divalent hydrocarbon group containing up to 8 carbon atoms which may contain therein an ether linkage containing an oxygen or sulfur atom; R^8 represents the same monovalent group as represented by R^3; X represents a hydrolyzable group or hydroxyl group bonded to the silicon atom; a represents 0 or an integer of 1 or 2; b represents 0 or an integer of from 1 to 3; and m and n each represents a number of 1 or more.

4,877,856

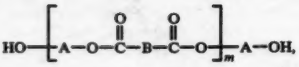
SOFT THERMOPLASTIC POLYURETHANE FOR BLOWN FILM APPLICATION

Dale R. Hall, Avon Lake, and Dennis J. Keller, Rocky River, both of Ohio, assignors to The BF Goodrich Company, Akron, Ohio

Filed Aug. 31, 1987, Ser. No. 91,000
Int. Cl.[4] C08G 18/38, 18/30
U.S. Cl. 528—44.79 18 Claims

1. An essentially linear film forming thermoplastic polyurethane elastomer comprising the reaction product of:

(a) a random mixed hydroxyl terminated polyester of the formula (I)



(I)

said polyester having a molecular weight of about 1800 to about 3600 and having essentially the structure of the reaction product of at least two straight chain aliphatic glycols containing from 2 to about 10 carbon atoms;

(b) an aromatic glycol chain extender of the formula (II)

HO—Y—OH,

aliphatic diol chain extenders other than small adventitious amounts not exceeding 0.75 percent of the weight of said polyester (a) being absent, and

(c) an isocyanate of the formula (III)

OCN—Z—NCO

wherein

(1) A is at least two alkylene radicals, oxydialkylene radicals or mixture thereof containing from 2 to about 10 carbon atoms, and B is an alkylene radical containing from 2 to about 10 carbon atoms or an arylene radical containing from 6 to about 12 carbon atoms or a mixture thereof, Y is a phenylenedialkylene or phenyleneoxyalkylene radical containing from about 8 to about 14 carbon atoms; and Z is a divalent organic radical;

(2) The value of m is such that said polyester has a molecular weight from about 1800 to about 3600;

(3) the molar ratio of said chain extender to said polyester is from about 0.75 to about 2;

(4) the molar quantity of said isocyanate is substantially equal to the sum of the molar quantities of said polyester and said chain extender, and

(5) said elastomer has a modulus at 100 percent elongation of 350 to 700 psi.

4,877,857

PREPARATION OF EPOXY RESINS

Robert P. Shirtum, Freeport, and Elaine B. Darby, San Antonio, both of Tex., assignors to The Dow Chemical Company, Midland, Mich.

Continuation-in-part of Ser. No. 190,608, May 5, 1988, abandoned. This application Jan. 11, 1989, Ser. No. 295,859

Int. Cl.[4] C08G *59/06, 59/10, 59/12*

U.S. Cl. 528—95 **24 Claims**

1. A process for the preparation of epoxy compounds which comprises reacting a molar excess of at least one epihalohydrin with at least one aromatic compound containing an active hydrogen atom reactive with an epihalohydrin in the presence of an organic solvent or mixture of organic solvents and an alkali metal hydroxide while controlling the concentration of water in the reaction mixture; the improvement which comprises

(1) after completion of the reaction, conducting one of the following

(a) cooling the reaction mixture to a temperature of not greater than about 30° C. followed by neutralization of the reaction mixture with carbon dioxide or weak inorganic acid in a quantity such that the reaction mixture has a pH of from about 7 to about 10;

(b) neutralizing the reaction mixture with carbon dioxide or weak inorganic acid in a quantity such that the reaction mixture has a pH of from about 7 to about 10 followed by cooling the reaction mixture to a temperature of not greater than about 30° C.; or

(c) simultaneously neutralizing the reaction mixture with carbon dioxide or weak inorganic acid in a quantity such that the reaction mixture has a pH of from about 7 to about 10 and cooling the reaction mixture to a temperature of not greater than about 30° C.;

(2) adding a sufficient quantity of water to form an aqueous layer and an organic layer;

(3) separating the organic layer and the aqueous layer;

(4) subjecting the organic layer to multiple washings with water; and

(5) recovering the epoxy resin from the resultant organic solution containing epihalohydrin, organic solvent and epoxy resin.

4,877,858

LIQUID-CRYSTALLINE POLYMER

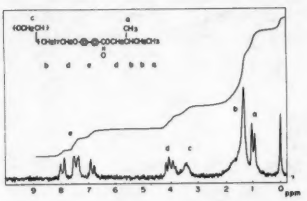
Satoshi Hachiya; Shunji Uchida, and Kenji Hashimoto, all of Kimitsu, Japan, assignors to Idemetsu Kosan Co., Ltd., Tokyo, Japan

Continuation-in-part of Ser. No. 136,868, Dec. 22, 1987, abandoned. This application Nov. 16, 1988, Ser. No. 272,010

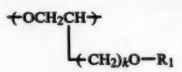
Claims priority, application Japan, Dec. 29, 1986, 61-309466; Nov. 17, 1987, 62-288475; Nov. 17, 1987, 62-288476

Int. Cl.[4] C08G *59/00*

U.S. Cl. 528—100 **23 Claims**



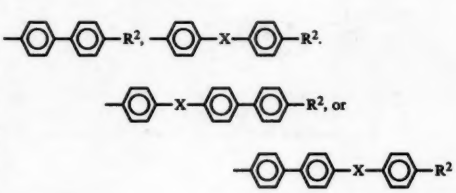
1. A ferroelectric liquid-crystalline polymer comprising the repeating units of the general formula (I)



(I)

in which:

k is an interger from 1 to 30; and



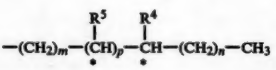
where:

X is —COO— or —OCO—; and

R^2 is —$COOR^3$, or —OR^3

where:

R^3 is



R^4 and R^5 being each independently —CH_3, a halogen radical, or —CN, m and n being each independently an integer from 0 to 10 with the proviso that n is not 0 when R^4 is —CH_3,

p being 0 or 1, and C marked with being an asymmetric carbon atom.

4,877,859

FLUORINE-CONTAINING NOVOLAK RESIN AND DERIVATIVE THEREOF

Sinji Tamaru, Suita; Motonobu Kubo, Toyonaka, and Masato Kashiwagi, Settsu, all of Japan, assignors to Daikin Industries, Ltd., Osaka, Japan

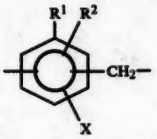
Filed Mar. 21, 1988, Ser. No. 171,126

Claims priority, application Japan, Mar. 24, 1987, 62-69394; Apr. 30, 1987, 62-108269

Int. Cl.[4] C08G *14/02, 8/04*

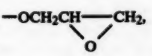
U.S. Cl. 528—129 13 Claims

1. Fluorine-containing novolak resin or its derivative having a repeating unit of the formula



(I)

wherein R^1 is a hydrogen atom or



R^2 is a hydrogen atom or alkyl group having 1 to 4 carbon atoms, X is a fluorine-containing monovalent organic group having 2 to 20 carbon atoms.

4,877,860

CATALYTIC COPOLYMERIZATION OF CARBON MONOXIDE/OLEFIN WITH KETONE/ALCOHOL DILUENT

Adrianus M. van Broekhoven, and Richard L. Wife, both of CM Amsterdam, Netherlands, assignors to Shell Oil Company, Houston, Tex.

Filed Jul. 29, 1988, Ser. No. 225,996

Claims priority, application Netherlands, Jul. 30, 1987, 8701799

Int. Cl.[4] C08G *67/02*

U.S. Cl. 528—392 14 Claims

1. In the process of producing linear alternating polymers of carbon monoxide and at least one ethylenically unsaturated hydrocarbon, by contacting the carbon monoxide and unsaturated hydorcarbon under polymerization conditions in a diluent in the presence of a catalyst composition formed from a palladium salt, the anion of a non-hydrohalogenic acid having a pKa below about 6, and a phosphine ligand, the improvement wherein the diluent is a ketone/alcohol mixture comprising more than 50% by volume of aliphatic ketones which have at most 10 carbon atoms and more than 5% by volume of aliphatic alcohols which have at most 10 carbon atoms.

4,877,861

CARBON MONOXIDE/OLEFIN POLYMERIZATION WITH DISUBSTITUTED 1,3-BIS PHOSPHINO PROPANE

Johannes A. Van Doorn, and Richard L. Wife, both of Amsterdam, Netherlands, assignors to Shell Oil Company, Houston, Tex.

Filed Jun. 20, 1988, Ser. No. 208,948

Claims priority, application Netherlands, Jun. 24, 1987, 8701473

Int. Cl.[4] C08G *67/02*

U.S. Cl. 528—392 9 Claims

1. In the process of producing linear alternating polymers of carbon monoxide and at least one ethylenically unsaturated hydrocarbon, by contacting the carbon monoxide and unsaturated hydrocarbon under polymerization conditions in the presence of a catalyst composition formed from a palladium salt, the anion of a non-hydrohalogenic acid having a pKa below about 6 and a bis(phosphino)alkane, the improvement wherein the bis(phosphino)alkane) is a 1,3-bis(phosphino)propane wherein the propane moiety is substituted with two hydrocarbyl substituents in the 2 position.

4,877,862

SOLID STATE POLYMERIZATION PROCESS FOR INCREASING THE MOLECULAR WEIGHT OF COLPOLY(ARYLENE SULFIDE)

David R. Fagerburg, and Joseph J. Watkins, both of Kingsport, Tenn., assignors to Eastman Kodak Company, Rochester, N.Y.

Continuation-in-part of Ser. No. 196,710, May 20, 1988, abandoned. This application Apr. 13, 1989, Ser. No. 337,712

Int. Cl.[4] C08G *75/14*

U.S. Cl. 528—481 3 Claims

1. A process comprising heating within a heating zone for a period of time and at a temperature which is at least 200 degrees C, said time and temperature sufficient to increase the molecular weight of the polymer such that the value of n is at least 200, a crystalline, solid polymer corresponding to the structure:

$$[(-A-S-)_{1-x}(-A-S-S-)_x]_n$$

wherein A is a divalent substituted or unsubstituted aromatic radical, x is in the range of 0.5 to 0.001 and n is at least 20, wherein the volume of the heating zone not occupied with polymer is either under vacuum or is occupied with an inert gas.

4,877,863

PROCESS FOR DECOLORIZING OF POLYMERS OF THE VINYLAROMATIC-CONJUGATED DIENE TYPE

Emmanuel Lanza, Waterloo, and Jean M. M. G. Naveau, Nivelles, both of Belgium, assignors to Labofina, S.A., Brussels, Belgium

Filed Sep. 20, 1988, Ser. No. 246,993

Claims priority, application Belgium, Sep. 21, 1987, 8701055

Int. Cl.[4] C08F *6/08, 6/06*

U.S. Cl. 528—486 10 Claims

1. A process for decolorizing vinyl aromatic-conjugated diene copolymers which have polymer chains which end with an alkali metal and are obtained by solution polymerization of at least one vinyl aromatic hydrocarbon and a conjugated diene in the presence of a catalyst based on an alkali metal, comprising treating the copolymer in solution with a thiocarboxylic acid of the formula:

$$(Y)_{2-n}-C-(R-COOH)_n \qquad (I)$$

wherein: X is S, S—CH_2—S, or S—S, Y and R are alkyl radicals each independently having 1 to 16 carbon atoms, and n is 1 or 2.

4,877,864

OSTEOINDUCTIVE FACTORS

Elizabeth A. Wang, Carlisle; John M. Wozney, Hudson, and Vicki Rosen, Boston, all of Mass., assignors to Genetics Institute, Inc., Cambridge, Mass.

Filed Mar. 26, 1987, Ser. No. 31,346

Int. Cl.[4] C07K *7/00;* A61K *37/00;* C12N *15/00*

U.S. Cl. 530—324 7 Claims

1. A purified cartilage and bone inductive protein produced by the steps comprising:

(a) culturing a cell transformed with a DNA sequence comprising the sequences as follows; GCC TTT CTT GGG

GAC ATT GCC CTG GAC GAA GAG GAC CTG AGG GCC TTC CAG GTA CAG CAG GCT GTG TAT CTC AGA CGG CAC ACA GCT CGT AAG TCC TCC ATC AAA GCT GCA, naturally occuring allelic sequences thereof, equivalent degenerative codon sequences thereof or sequences which

(1) hybridize thereto under stringent hybridization condition; and

(2) upon expression encode a protein characterized by the ability to induce bone and/or cartilage formation in the in vivo rat bone formation assay at a concentration of between about 10–1000 nanograms per gram bone; and

(b) recovering and purifying from said culture medium said protein so as to be substantially free from association with other proteinaceous materials and characterized by a peptide sequence comprising the following sequence; Ala Phe Leu Gly Asp Ile Ala Leu Asp Glu Glu Asp Leu Arg Ala Phe Gln Val Gln Gln Ala Val Asp Leu Arg Arg His Thr Ala Arg Lys Ser Ser Ile Lys Ala Ala, and naturally occuring allelic sequences thereof.

4,877,865

BOVINE INTERFERON

Baruch Velan, Rishon Le-Zion; Sara Cohen, Bat-Yam; Haim Grosfeld, Rehovot, and Avigdor Shafferman, Ness-Ziona, all of Israel, assignors to State of Israel, Prime Minister's Office, Israel Institute for Biological Research, Nes Ziona, Israel

Filed Apr. 9, 1985, Ser. No. 721,204

Claims priority, application Israel, Apr. 15, 1984, 71555

Int. Cl.[4] C07K *13/00, 15/26;* A61K *45/02;* C12P *21/00*

U.S. Cl. 530—351 12 Claims

1. A genetically engineered bovine interferon of the IFN-α-type which is pre-BoIFN-α A, mature BoIFN-α A and Met-mat-BoIFn-α A defined by the amino acid sequence with a methionine codon preceding the Cys codon, as shown in FIG. 1.

4,877,866

METHOD OF PRODUCING A VIRUS SAFE, STORAGE-STABLE, AND INTRAVENOUSLY TOLERABLE IMMUNOGLOBULIN-G PREPARATION

Dieter Rudnick, Rödermark; Norbert Kothe, Kronberg/Ts.; Herbert Dichtelmüller, Sulzbach/Ts.; Detlef Piechaczek, Münster; Wolfgang Stephan, Dreieich, and Hans Schleussner, Frankfurt am Main, all of Fed. Rep. of Germany, assignors to Biotest Pharma GmbH, Frankfurt, Fed. Rep. of Germany

Filed Nov. 18, 1987, Ser. No. 122,092

Claims priority, application Fed. Rep. of Germany, Nov. 27, 1986, 3640513

Int. Cl.[4] A61K *39/395, 41/00*

U.S. Cl. 530—387 13 Claims

1. A method of producing a virus-safe, storage-stable, and intravenously tolerable immunoglobulin-G preparation from a plasma that has had the coagulation factors removed from it or of a plasma fraction or serum fraction that contains immunoglobulin G, comprising

(a) diafiltering or gel filtering either the plasma that has had the coagulation factors removed from it or the plasma or serum fraction that contains the immunoglobulin G to eliminate any precipitant, and establishing an ion composition sufficient for subsequent fractionation,

(b) subjecting the resulting protein solution from (a) to fractionation over an ion exchanger to separate the immunoglobulin G,

(c) removing the proteolytic enzymes in the resulting immunoglobulin-G solution of (b) by means of affinity chromatography over a dye linked sorbent and/or inhibiting such enzymes by the addition of antithrombin III,

(d) treating the accordingly stabilized immunoglobulin-G solution of (c), at a protein concentration of 20 to 60 g/l and a pH of 6.0 to 8.0, with 0.03 to 0.07% of β-propiolactone, diluting it to a protein concentration of 5 to 20 g/l, and subjecting it to ultraviolet radiation,

(e) again diafiltering the accordingly sterilized dilute immunoglobulin-G solution or gel filtration to remove lower molecular-weight substances, and

(f) adjusting the accordingly stabilized and sterilized solution to the desired protein content of 2 to 16%, and conducting sterile filtering.

4,877,867

ANTIBODIES FOR THE DETECTION OF MAMMALIAN RAS GENE PRODUCTS, METHOD OF PREPARING AND METHOD OF USING SAME

Channa Shalitin, 70 Pinsker Str., Haifa, Israel

Continuation-in-part of Ser. No. 753,963, Jul. 11, 1985, Pat. No. 4,767,714. This application Jan. 15, 1988, Ser. No. 144,493

Claims priority, application Israel, Jul. 19, 1984, 72452

Int. Cl.[4] C07K *3/00, 3/02*

U.S. Cl. 530—387 11 Claims

1. Antibodies specific in their binding properties towards nonfixed mammalian ras gene-expressed proteins, obtained using, as an immunogen, a p20 polypeptide derived from chromatin or the degraded p20 polypeptide having a molecular weight in the range of 16,000 to 20,000 and amino acid composition as follows: aspartic+glutamic acids in the range of 21.8–25.5 mole %; lysine + arginine in the range of 13.5–21.4 mole % and a ratio of lysine to arginine in the range of 2.31–3.1.

7. A method for obtaining anti-p20 antibodies which are specific in their binding properties towards mammalian ras gene-expressed proteins wherein animals are immunized with portions of sodium chloride-extracted p20 polypeptide derived from chromatin or the degraded p20 polypeptide having a molecular weight in the range of 16,000 to 20,000 and amino acid composition as follows: aspartic +glutamic acids in the range of 21.8–25.5 mole %; lysine +arginine in the range of 13.5–21.4 mole % and a ratio of lysine to arginine in the range of 2.31–3.1 emulsified in complete Freund's adjuvant and injected intradermally, said animals receiving booster injections with p20 polypeptide or degraded p20 polypeptide and bled thereafter.

9. A method of detecting p21 ras gene-expressed proteins comprising obtaining anti-p20 antibodies according to the method of claim 7 and detecting said p21 ras gene-expressed proteins with said anti-p20 antibodies by immunoprecipitation.

4,877,868

RADIONUCLIDE ANTIBODY COUPLING

John M. Reno, and Becky J. Bottino, both of Lynwood; D. Scott Wilbur, Edmonds, all of Wash., assignors to NeoRx Corporation, Seattle, Wash.

Filed Mar. 12, 1986, Ser. No. 838,992

Int. Cl.[4] C07K *3/00*

U.S. Cl. 530—390 25 Claims

1. A method of preparing a metal radionuclide-labeled protein from a protein precursor having at least oe disulfide linkage, the method comprising:

reacting said protein precursor with a disulfide reducing agent to form a dimercaptoprotein;

reacting said dimercaptoprotein with a divalent or trivalent cation to yield a cation-derivatized protien; and

combining said cation-derivatized protein with ^{99m}Tc, ^{186}Re, ^{188}Re or ^{67}Cu to form said metal radionuclide-labeled protein.

4,877,869

ACID CATALYZED NITRATION

Donald C. Young, Fullerton, Calif., assignor to Union Oil Company of California, Los Angeles, Calif.

Division of Ser. No. 771,259, Aug. 30, 1985, Pat. No. 4,722,986, which is a continuation-in-part of Ser. No. 679,235, Dec. 7, 1984, Pat. No. 4,589,925, which is a continuation-in-part of Ser. No. 675,774, Nov. 28, 1984, Pat. No. 4,673,522, which is a continuation-in-part of Ser. No. 673,358, Nov. 20, 1984, Pat. No. 4,664,717, which is a continuation-in-part of Ser. No. 673,508, Nov. 20, 1984, which is a continuation-in-part of Ser. No. 453,496, Dec. 27, 1982, which is a continuation-in-part of Ser. No. 442,296, Nov. 17, 1982, abandoned, which is a continuation-in-part of Ser. No. 444,667, Nov. 26, 1982, abandoned, which is a continuation-in-part of Ser. No. 331,001, Dec. 15, 1981, Pat. No. 4,402,852, which is a continuation-in-part of Ser. No. 330,904, Dec. 15, 1981, Pat. No. 4,404,116, which is a continuation-in-part of Ser. No. 318,629, Nov. 5, 1981, Pat. No. 4,445,925, which is a continuation-in-part of Ser. No. 318,368, Nov. 5, 1981, Pat. No. 4,447,253, which is a continuation-in-part of Ser. No. 318,343, Nov. 5, 1981, Pat. No. 4,397,675. This application Jan. 29, 1988, Ser. No. 149,701

Int. Cl.[4] C08E *5/02;* B01J *31/00;* C08F *283/02*

U.S. Cl. 536—35 17 Claims

1. The method for nitrating an organic compound, which method comprises the step of reacting said organic compound with nitric oxide in the presence of a catalytically active amount of a combination of sulfuric acid, and a chalcogen-containing compound having the empirical formula

wherein X is a chalcogen, each of RI and R_2 is selected from the group consisting of hydrogen, NR_3R_4 and NR_5, at least one of R_1 and R_2 is other than hydrogen, each of R_3 and R_4 is selected from the group consisting of hydrogen and monovalent organic radicals, and R_5 is a divalent organic radical, which combination comprises a catalytically active amount of the mono-adduct of sulfuric acid and said chalcogen-containing compound.

4,877,870

PROCESS FOR PRODUCING 10-HYDROXYANTHRACYCLINES

Hamao Umezawa, deceased, late of Tokyo (by Kazuo Umezawa, heir); Kuniaki Tatsuta, Tokyo; Hiroyuki Kawai, and Shohachi Nakajima, both of Maebashi, all of Japan, assignors to Kirin Beer Kabushiki Kaisha, Tokyo, Japan

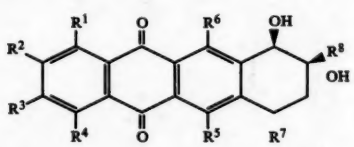
Filed Jun. 30, 1987, Ser. No. 68,630

Claims priority, application Japan, Jul. 4, 1986, 61-157358

Int. Cl.[4] C07H *15/24;* C07C *49/66*

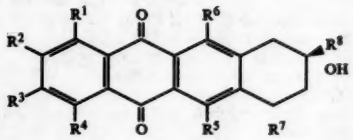
U.S. Cl. 536—6.4 7 Claims

1. A process for producing a 10-hydroxyanthracycline of the following formula (II)



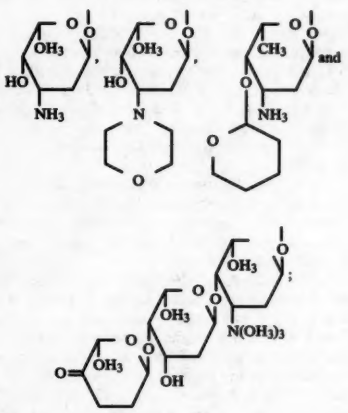
(II)

which consists of reacting a compound of the following formula (I)



(I)

or an acid addition salt thereof with an N-oxide of a tertiary amine wherein R^1 through R^6 are selected from the group consisting of H, OH and OCH_3; R^7 is selected from the group consisting of H, OH,



and R^8 is selected from the group consisting of C_2H_5, $COCH_3$, $CH(OH)CH_3$, $CH(OH)CH_2(OH)$ and $COCH_2OH$.

4,877,871

SYNTHESIS OF SUCROSE POLYESTER

Lawrence P. Klemann, Somerville; John W. Finley, Whippany, and Anthony Scimone, Cedar Grove, all of N.J., assignors to Nabisco Brands, Inc., East Hanover, N.J.

Filed Jun. 14, 1988, Ser. No. 206,656

Int. Cl.[4] C07G *17/00;* C07H *13/02;* C09F *5/08*

U.S. Cl. 536—124 31 Claims

1. A process for synthesizing sucrose fatty acid polyesters comprising reacting a lower sucrose fatty acid ester selected from the group consisting of mono-, di- or tri-esters of fatty acids or mixtures thereof with fatty acids in a solvent in the presence of an effective amount of a carbodiimide.

4,877,872

PRODUCTION AND USE OF DIMERS OF HEMATOPOROPHYRIN, PURPURINS, CHLORINES AND PURPURIN- AND CHLORIN-COMPLEXES

Alan R. Morgan; Steven H. Selman; Greta M. Garbo, and Rick W. Keck, all of Toledo, Ohio, assignors to The University of Toledo, Toledo, Ohio

Filed Jun. 24, 1986, Ser. No. 877,770

Int. Cl.[4] A61K *31/40*

U.S. Cl. 540—145 3 Claims

1. A dimer of (1) a purpurin or a purpurin metal complex having the structure of any of FIGS. 1, 7, 14–18, 29–38, 44–48 or 54–58 of the attached drawings, or a chlorin or a chlorin metal complex having the structure of any of FIGS. 2, 8, 19–28, 39–43 or 49–53 of the attached drawings and (2) hematoporphyrin or a purpurin or a purpurin metal complex having

the structure of any of FIGS. **1, 7, 14–18, 29–38, 44–48** or **54–58** of the attached drawings, or a chlorin or a chlorin metal complex having the structure of any of FIGS. **2, 8, 19–28, 39–43** or **49–53** of the attached drawings, wherein

each of **R10** through **R13** and **R16** is hydrogen, and

each of **R1** through **R9, R14** and **R15** is:

H or CHO,

an alkyl group having from 1 to 4 carbon atoms, excluding tertiary butyl,

an alkylene group having from 2 to 4 carbon atoms,

a group having the formula $R_2N(R_3)_2$ where R_2 is a bivalent aliphatic hydrocarbon radical having from 1 to 4 carbon atoms, wherein any carbon to carbon bond is either a single or a double bond, and not more than one is a double bond; R_3 is hydrogen or an alkyl group having from 1 to 2 carbon atoms and the two R_3 groups can be the same or different,

a group having the formula $R_2N(R_4)_3A$ where R_2 is a bivalent aliphatic hydrocarbon radical having from 1 to 4 carbon atoms, wherein any carbon to carbon bond is either a single or a double bond, and not more than one is a double bond; A is a physiologically acceptable anion; and R_4 is an alkyl group having from 1 to 2 carbon atoms and the three R_4 groups can be the same or different,

a group having the formula R_2OH were R_2 is a bivalent aliphatic hydrocarbon radical having from 1 to 4 carbon atoms, wherein any carbon to carbon bond is either a single or a double bond, and not more than one is a double bond,

CO_2R', CH_2CO_2R' or $CH_2CH_2CO_2R'$, where R' is hydrogen or an alkyl group having from 1 to 4 carbon atoms, excluding tertiary butyl, an amino acid moiety which is attached to the purpurin or chlorin moiety through a carbonyl which is a part of an amide produced by reaction between an amine function of a naturally occurring amino acid and a CO_2R', CH_2CO_2R' or $CH_2CH_2CO_2R'$ group of the purpurin or chlorin,

a monoclonal antibody moiety which selectively binds to malignant tumors and is attached to the purpurin or chlorin moiety through a carbonyl which is a part of an amide produced by reaction between an amine funtion of a monoclonal antibody and a CO_2R', CH_2CO_2R' or $CH_2CH_2CO_2R'$ group of the purpurin or chlorin, or

in the purpurins and purpurin metal complexes of FIGS. **1, 7 14–18, 34–38** and **54–58** and in the chlorins and chlorin metal complexes of FIGS. **2** and **8 R1** can be a bivalent aliphatic hydrocarbon radical having from 2 to 4 carbon atoms wherein both of the valences of the radical are attached to the same carbon atom thereof and to a carbon atom of the purpurin, chlorin, or metal complex, and in the purpurins and purpurin metal complexes of FIGS. **29–33** and of FIGS. **44–48** and in the chlorins and chlorin metal complexes of FIGS. **19–28, 39–43** and **49–53**, both **R1** and **R2** can be bivalent aliphatic hydrocarbon radicals having from 2 to 4 carbon atoms wherein both of the valences of the radical are attached to the same carbon atom thereof and to a carbon atom of the purpurin or metal complex, and

M comprises a metal cation that is complexed with two of the nitrogens of the purpurin or chlorin and is Ag, Al, Ce, Co, Cr, Dy, Er, Eu, Fe, Ga, Gd, Hf, Ho, In, La, Lu, Mn, MO, Nd, Pb, Pd, Pr, Pt, Rh, Sb, Sc, Sm, Sn, Tb, Th, Ti, Tl, Tm, U, V, Y, Yb, Zn or Zr,

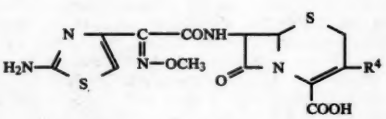
said dimer being the product of reaction between a CO_2R', CH_2CO_2R' or $CH_2CH_2CO_2R'$ group of the (1) purpurin, chlorin or metal complex or of the (2) hematoporphyrin, purpurin, chlorin or metal complex and an amino nitrogen or an alcoholic OH group of the other, with the proviso that not more than one of **R1** through **R9, R14** and **R15** is CHO, a group having the formula $R_2N(R_3)_2$, a group having the formula $R_2N(R_4)_3A$, an amino acid moiety or a monoclonal antibody moiety.

4,877,873
SYN-ISOMER OF 3,7-DISUBSTITUTED-3-CEPHEM-4-CARBOXYLIC ACID COMPOUNDS AND PROCESSES FOR THE PREPARATION THEREOF

Takao Takaya, Sakai; Takashi Masugi, Toyonaka; Hisashi Takasugi, Osaka, and Hiromu Kochi, Sakai, all of Japan, assignors to Fujisawa Pharmaceutical Co., Ltd., Osaka, Japan

Division of Ser. No. 767,700, Feb. 11, 1977, Pat. No. 4,166,115.
This application May 21, 1979, Ser. No. 40,976
Claims priority, application United Kingdom, Apr. 2, 1976, 14916/76; Jun. 7, 1976, 23490/76; Japan, Oct. 19, 1976, 51-125826
Int. Cl.[4] C07D *501/34*
U.S. Cl. 544—227 **2 Claims**

1. Syn-isomer of 3,7-disubstituted -3-cephem-4-carboxylic acid compounds of the formula:



wherein R^4 is thiadiazolylthiomethyl, and pharmaceutically acceptable salts thereof.

4,877,874
PROCESS FOR PRODUCING N-AMINOHEXAMETHYLENEIMINE

Minoru Kawano; Katsumi Simizu; Eiji Isonaga, and Shigeo Kurata, all of Ube, Japan, assignors to Ube Indrustries, Ltd., Ube, Japan

Filed May 26, 1987, Ser. No. 54,315
Claims priority, application Japan, Jun. 13, 1986, 61-136113
Int. Cl.[4] C07D *295/22*
U.S. Cl. 540—606 **18 Claims**

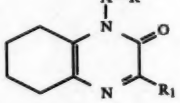
1. A process for producing N-aminohexamethyleneimine which comprises reacting hexamethyleneimine with hydroxylamine-o-sulfonic acid in the presence of an aqueous solvent and an inorganic base and wherein the reaction is carried out by injecting simultaneously an aqueous solution of hydroxylamine-O-sulfonic acid and the inorganic base into an aqueous solution of hexamethyleneimine.

4,877,875
1-SUBSTITUTED ALKYL-2-OXO-HEXAHYDROQUINOXALINE DERIVATIVES

Masao Yaso; Yukio Suzuki; Kensuke Shibata, and Eiichi Hayashi, all of Shizuoka, Japan, assignors to Toyo Jozo Kabushiki Kaisha, Shizuoka, Japan

Division of Ser. No. 20,012, Feb. 25, 1987, Pat. No. 4,837,319.
This application Oct. 19, 1988, Ser. No. 259,992
Claims priority, application Japan, Feb. 25, 1986, 61-38210
Int. Cl.[4] C07D *403/06, 403/14, 401/06, 413/06*
U.S. Cl. 544—116 **8 Claims**

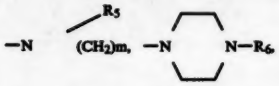
1. A compound of the formula

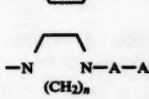


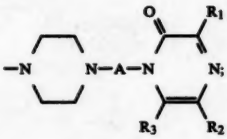
wherein

A is lower alkylene; R_1 is selected from the group consisting of alkyl, phenyl-lower alkyl, and substituted phenyl-lower alkyl;

and R is selected from the group consisting of 1-methyltetrazole-5-yl-thio, 1-imidazolyl, morpholino,







in which R_5 is hydrogen, lower alkyl or aryl, R_6 is hydrogen, lower alkyl, hydroxy-lower alkyl, aryl, aryl-lower alkanoyl, arylcarbonyl, arylsulfonyl or thienyl-lower alkanoyl, Ar is phenyl or phenyl substituted with C_{1-3} alkyl, halogen, nitro, or lower alkoxy, A and R_1 are as defined above, R_2 and R_3 are each lower alkyl or together form tetramethylene, m is an integer from 4–6, and n is 2 or 3; and pharmaceutically acceptable salts thereof.

4,877,876

NOVEL INDENOTHIAZOLE DERIVATIVE AND PROCESS FOR PREPARING THE SAME

Masayoshi Tsuji; Akira Nakagawa, both of Tosu; Hisataka Inoue, Okawa; Terumi Hachiya, Kanzaki; Yoshihiro Tanoue, Chikushi; Kouichi Ikesue, Saga; Masaru Saita, Miyaki; Takenobu Mizoguchi, Tosu; Testsuo Aoki; Hironobu Sato, both of Miyaki, and Kanji Nodo, Chikushino, assignors to Hisamitsu Pharmaceutical Co., Inc., Tosu, Japan

PCT No. PCT/JP87/00021, § 371 Date Aug. 31, 1987, § 102(e) Date Aug. 31, 1987, PCT Pub. No. WO87/04434, PCT Pub. Date Jul. 30, 1987

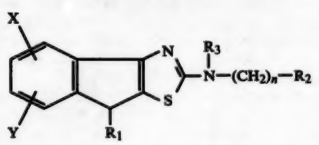
PCT Filed Jan. 14, 1987, Ser. No. 107,600

Claims priority, application Japan, Jan. 16, 1986, 61-7640

Int. Cl.[4] C07D *277/60, 417/12*

U.S. Cl. 544—133 **6 Claims**

1. An indenothiazole derivative of formula:



(Ia)

wherein X and Y are identical with, or different from, each other and are each hydrogen, halogen, lower alkyl having 1–6 carbon atoms or lower alkoxyl having 1–6 carbon atoms; n is an integer of from 0 to 4; R_1 is hydrogen, lower alkyl having 1–6 carbon atoms or phenyl; R_2 is lower alkyl having 1–6 carbon atoms, cyclohexyl, lower alkoxyl having 1–6 carbon atoms, alkenyl having 3–6 carbon atoms, phenyl, m-(1-piperidinylmethyl)phenoxy, phenyl substituted by a halogen atom, hydroxyl, lower alkyl having 1–6 carbon atoms, lower alkoxyl having 1–6 carbon atoms or trifluoromethyl group, an heterocyclic ring selected from the group consisting of pyridyl, pyridyl mono- or di-substituted by one or two lower alkyl having 1–6 carbon atoms and thiazolyl and cycloamino selected from the group consisting of morpholino, piperidino, pyrrolidino, piperazino substituted by lower alkyl having 1–6 carbon atoms and piperidino substituted by lower alkyl having 1–6 carbon atoms; R_3 is hydrogen, lower alkyl having 1–6 carbon atoms, acetyl or trifluoromethylcarbonyl, or R_2 and R_3 are combined to form a cycloamino selected from the group consisting of pyrrolidino group, piperidino, morpholino and piperidino di-substituted by two lower alkyl having 1–6 carbon atoms.

4,877,877

1-SUBSTITUTED ALKYL-2-OXO-HEXAHYDROQUINOXALINE DERIVATIVES

Masao Yaso; Yukio Suzuki; Kensuke Shibata, and Eiichi Hayashi, all of Shizuoka, Japan, assignors to Toyo Jozo Kabushiki Kaisha, Shizuoka, Japan

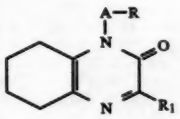
Division of Ser. No. 20,012, Feb. 25, 1987, Pat. No. 4,837,319. This application Oct. 19, 1988, Ser. No. 260,904

Claims priority, application Japan, Feb. 25, 1986, 61-38210

Int. Cl.[4] C07D *241/44, 403/06, 413/06*; A61K *31/495*

U.S. Cl. 544—354 **6 Claims**

1. A compound of the formula



wherein

A is lower alkylene; R_1 is selected from the group consisting of alkyl, phenyl-lower alkyl, and substituted phenyl-lower alkyl; and

R is selected from the group consisting of hydroxyl, halogen, lower alkanoyloxy, R_4-carbamoyloxy and arylthio, in which R_4 is lower alkyl or aryl; and pharmaceutically acceptable salts thereof.

4,877,878

2-AZOLYLMETHYL-2-ARYL-1,3-DIOXOLANES AND THE SALTS THEREOF, PROCESSES FOR THE PREPARATION THEREOF, AGENTS CONTAINING SAME, AND THE USE THEREOF

Klaus-Dieter Kampe, Bad Soden am Taunus; Wolfgang Raether, Dreieich, and Walter Dittmar, Hofheim am Taunus, all of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

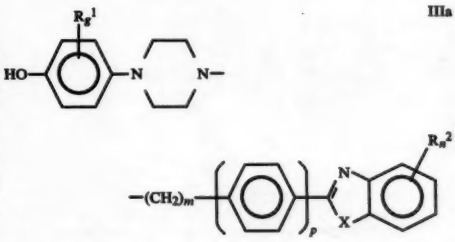
Division of Ser. No. 28,173, Mar. 19, 1987, Pat. No. 4,818,758. This application Dec. 29, 1988, Ser. No. 291,952

Claims priority, application Fed. Rep. of Germany, Mar. 21, 1986, 3609597

Int. Cl.[4] C07D *403/06, 403/10*

U.S. Cl. 544—368 **1 Claim**

1. A compound of the formula IIIa



IIIa

in which:

R^1 denotes C_1–C_3-alkyl, F or Cl,

g denotes 0, 1 or 2,

m denotes 0, 1, 2, 3 or 4,
p denotes 0 or, if m does not equal 0, denotes 0 or 1,
X denotes O or, if m does not equal 0 or if, simultaneously, m and p are 0 and n does not equal 0, denotes O, S or N—R^3, where
R^3 denotes H, C_1–C_4-alkyl, phenyl or benzyl,
R^2, independently of one another, denote C_1–C_4-alkyl, C_1–C_4-alkoxy, F, Cl, Br, I, SCH_3, CO—C_6H_5, CF_3 or NO_2, and
n denotes 0, 1 or 2,
or, if n is 2,
R^2 additionally denotes a —CH=CH—CH=CH group which, together with the phenyl ring, forms a naphthyl radical,
or, if p is 0 and n is 1,
R^2 additionally denotes a phenoxy group which is unsubstituted or carries up to 2 identical or different substituents in the phenyl radical, where the substituents denote F, Cl, Br, OCH_3, CH_3 or C_2H_5,
and the acid-addition salts thereof.

4,877,879

PREPARATION OF POLYETHER COMPOSITIONS

Michael A. P. Gansow, Waedenswil, Switzerland, assignor to Dow Chemical (Nederland) B.V., Terneuzen, Netherlands

Filed Jan. 4, 1988, Ser. No. 140,379

Claims priority, application United Kingdom, Jan. 6, 1987, 8700101

Int. Cl.[4] C07D *295/12*; C07C *47/18, 41/12*

U.S. Cl. 544—402 **18 Claims**

1. A process for stabilizing against release of complexed alkylene oxide, a crude polyether composition prepared from one or more alkylene oxides using an amine initiator in the presence of an alkaline catalyst, comprising contacting the composition with an effective amount of a reducing agent sufficient to effect said stabilization.

9. A process for neutralizing and stabilizing a crude, amine-initiated polyether composition prepared using an alkaline catalyst, comprising contacting the composition with an amount of formic acid in substantial stoichiometric excess with respect to the amount of alkaline catalyst used.

4,877,880

PROCESS FOR PREPARATION OF IMINOTHIAZOLIDINES

Frank X. Woolard, Richmond, Calif., assignor to ICI Americas Inc., Wilmington, Del.

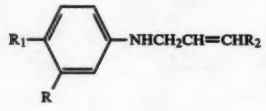
Continuation-in-part of Ser. No. 126,134, Nov. 17, 1987, abandoned. This application Dec. 9, 1988, Ser. No. 282,807

Int. Cl.[4] C07D *277/18*

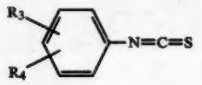
U.S. Cl. 548—190 **10 Claims**

1. A process for the preparation of iminothiazolidines compounds which comprises:

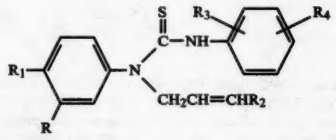
(a) reacting an N-3-substituted allyl aniline having the formula



in which
R is halo, nitro, cyano, C_1–C_4 alkyl, C_1–C_4 alkoxy, pentahalomethyl, difluoromethyl, pentafluoroethyl, trifluoromethylthio, difluoromethoxy, trifluoromethoxy, tetrafluoroethoxy, methylsulfonyl, C_1–C_4 alkyloxyiminomethyl, benzyloxyiminomethyl, 1-(C_1–C_4 alkyl-)oxyiminoethyl or 1-benzyloxyiminoethyl;
R_1 is hydrogen or halo; and
R_2 is C_1–C_4 alkyl or C_1–C_4 haloalkyl; with an arylisothiocyanate of the formula

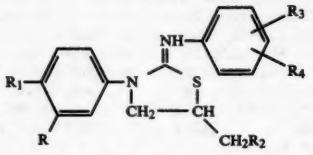


wherein R_3 and R_4 are independently hydrogen, halo, nitro, cyano, C_1–C_4 alkyl, C_1–C_4 haloalkyl, C_1–C_4 alkoxy, C_1–C_4 fluoroalkoxy or C_1–C_4 alkylthio, in the presence of an organic solvent and a suitable catalyst, at a temperature and for a sufficient period of time to yield an N,N'-diaryl-N-3-substituted allyl thiourea of the formula



and

(b) treating said N,N'-diaryl-N-3-substituted allyl thiourea with about one equivalent of methanesulfonic acid or trifluoromethanesulfonic acid in the presence of an aprotic solvent at a temperature of from about 20° C. to about 45° C. and for a sufficient period of time to produce an iminothiazolidine of the formula



4,877,881

PROCESS OF PREPARING PYRAZOLES, ISOXAZOLES AND ANALOGS THEREOF HAVING ACTIVITY AS 5-LIPOXYGENASE INHIBITORS

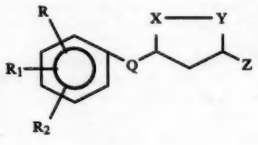
Thomas R Belliotti, Ypsilanti; David T. Connor, Ann Arbor; Daniel L. Flynn, Ann Arbor; Catherine R. Kostlan, Ann Arbor, and Donald E. Nies, Ann Arbor, all of Mich., assignors to Warner-Lambert Company, Morris Plains, N.J.

Division of Ser. No. 32,730, Apr. 6, 1987, which is a continuation-in-part of Ser. No. 910,692, Sep. 22, 1986, abandoned, which is a continuation-in-part of Ser. No. 861,179, May 9, 1986, abandoned. This application Sep. 21, 1988, Ser. No. 247,837

Int. Cl.[4] A61K *31/42, 31/415*; C07D *261/10, 231/20*

U.S. Cl. 548—240 **1 Claim**

1. A process for the preparation of a compound of Formula (I)

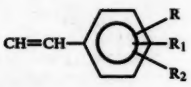


I

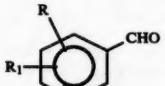
wherein

(1) is a single or double bond;
(2) R, R_1, and R_2 may be the same or different and are selected from the group consisting of hydrogen, lower alkyl, hydroxy, OR_3 wherein R_3 is lower alkyl, $C(O)OR_4$ wherein R_4 is hydrogen or lower alkyl, $OC(O)R_3$ wherein R_3 is independently as defined above, $C(O)R_3$ wherein R_3 is independently as defined above, NR_6R_7, wherein R_6 and R_7 may be the same or different and are hydrogen or lower alkyl, $NHC(O)R_3$ wherein R_3 is independently as defined above, NHCHO, $NHSO_2R_3$ wherein R_3 is independently as defined above, $NHCONHR_4$ wherein R_4 is as defined above, hydroxymethyl, halogen, trifluoromethyl, SR_4 wherein R_4 is independently as defined above, or nitro;
(3) Q is CH=CH
(4) X and y are (i) N, (ii) NR_5 wherein R_5 is hydrogen, lower alkyl,

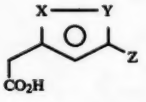
wherein R_1' and R_2' may be the same or different and are hydrogen or lower alkyl, $C(O)R_4$ wherein R_4 is independently as defined above, cyclolakyl or from three to twenty carbons having of from three to eight ring carbons, aryl, or aralkyl, (iii) O, (iv) S; with the proviso that X and Y cannot both be N, NR_5O, or S at once and with the proviso that one of X and Y cannot be O at the same time the other of X and Y is S or NR_5 and that one of X and Y cannot be S at the same time the other of X and Y is NR_5;
(5) Z is H, lower alkyl, aryl, aralkyl, $OC(O)R_3$ wherein R_3 is independently as defined above, $C(O)OR_4$ wherein R_4 is independently as defined above, $C(O)R_3$ wherein R_3 is, independently, as defined above, $CH(R_1')CO_2R_2'$ wherein R_1' and R_2' are independently as defined above, halogen, trifluoromethyl,



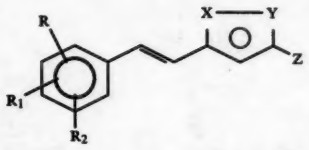
wherein R, R_1 and R_2 are independently as defined above, heteroaryl, or heteroaralkyl; which comprises contacting a compound of the formula



wherein R, R_1 and R_2 are as defined above and a compound of the formula



wherein Z, X and Y are as defined above; and which is in situ dehydrated and decarboxylated to yield a compound of the formula



wherein X and y are as defined above and R, R_1, R_2 and Z are also as defined above.

4,877,882

PROCESS FOR THE PREPARATION OF D-(+)-BIOTIN

Eike Poetsch, Mühltal, and Michael Casutt, Pfungstadt, both of Fed. Rep. of Germany, assignors to Merck Patent Gesellschaft mit Beschrankter Haftung, Darmstadt, Fed. Rep. of Germany

Continuation-in-part of Ser. No. 141,161, Jan. 6, 1988, Pat. No. 4,837,402, which is a division of Ser. No. 39,342, Apr. 17, 1987, Pat. No. 4,732,987. This application Oct. 5, 1988, Ser. No. 253,995

Claims priority, application Fed. Rep. of Germany, Apr. 19, 1986, 3613245; Feb. 7, 1987, 3703872

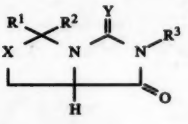
Int. Cl.[4] C07D 495/04

U.S. Cl. 548—303 **10 Claims**

1. A process for the preparation of D-(+)-biotin, comprising:

(a)

(i) Reducing a starting material compound of the formula



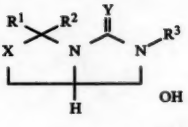
wherein

R^1 and R^2 are each in independently H, alkyl, substituted alkyl, cycloalkyl, aryl, aralkyl or heteroaryl, wherein the heteroatom is O, N, or S, or taken together are alkylene, substituted alkylene or heteroalkylene, wherein the heteroatom is O, N, or S;

R^3 is H or benzyl, benzyl substituted by one or more of C_{1-4}-alkyl, C_{1-4}-alkoxyl, C_{3-5}-alkyl-2-enyl or C_{3-6}-trialkylsilyl;

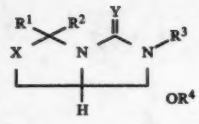
X and Y independently are each O or S;

to an alcohol of the formula



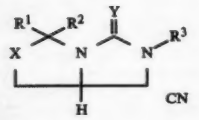
by reacting said starting material compound with a reducing agent or by catalytically hydrogenating said starting material compound:

(ii) converting said alcohol into an activated ester of the formula



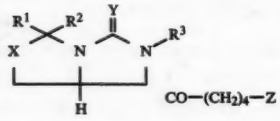
wherein R^4 is an activating ester group and is alkanoyl, aroyl, alkylsulfonyl or azole-M, wherein azole is a fused or non-fused, substituted or unsubstituted, nitrogen-containing 5-membered ring, and M is CO, CS, SO_2, SO or S;

(iii) reacting said activated ester with an alkali metal cyanide, an alkaline earth metal cyanide or a cyanosilane, to give a nitrile of the formula



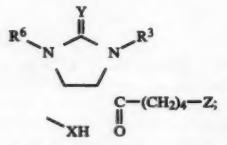
(b)

(i) reacting the product of step (a) (iii) with an organometallic compound to given an oxo compound of the formula

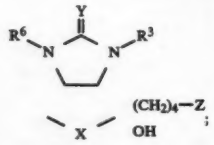


wherein Z is OR^5 or $COOR^5$, wherein R^5 is H, alkyl, cycloalkyl or aryl;

(ii) splitting said oxo compound by treatment with an acid, a reducing agent or a mixture thereof to give an imidazolidine of the formula



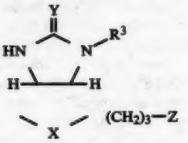
(iii) cyclizing said imidazolidine by reacting with a base to give a biotin derivative of the formula



wherein R^6 is H or R^1R^2CH;

and (iv) converting said derivative into D-(+)-biotin by known processes, or

(c) (i) the oxo compound produced in step (b) (i) above is converted with an acid, to a biotin derivative of the formula



and (ii) this derivative is converted into D-(+)-biotin by known processes.

4,877,883

SUBSTITUTED PYRAZOLES

Henrich H. Paradies, Iserlohn, Fed. Rep. of Germany, assignor to Medice chem.-pharm. Fabrik Putter GmbH & Co. KG, Fed. Rep. of Germany

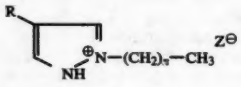
Filed Aug. 6, 1987, Ser. No. 82,891

Claims priority, application Fed. Rep. of Germany, Aug. 7, 1986, 3626700

Int. Cl.[4] C07D *231/12, 231/14, 231/18*

U.S. Cl. 548—375 **2 Claims**

1. A compound having the formula



in which:

R is a member selected from the group consisting of H, CH_3, and OH;

Z is a member selected from the group consisting of chloride, bromide, iodide, maleate, formate, acetate, propionate, HSO_4^-, malate, fumarate, salicylate, alginate, gluconate, glucoronate, galactoronate, ethylsulfate and H_2PO_4; and

n is 8 to 20.

4,877,884

4-BENZYLOXY-3-PYRROLIN-2-ON-1-YL ACETAMIDE PRODUCTION

Thomas Meul, Canton Valais, Switzerland, assignor to Lonza Ltd., Gampel/Valais, Switzerland

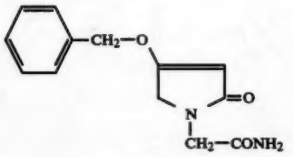
Division of Ser. No. 181,435, Apr. 14, 1988, which is a division of Ser. No. 60,262, Jun. 10, 1987. This application Apr. 11, 1989, Ser. No. 336,070

Claims priority, application Switzerland, Jun. 26, 1986, 2567/86

Int. Cl.[4] C07D *207/38*

U.S. Cl. 548—544 **17 Claims**

1. Process for the production of 4-hydroxy-3-pyrrolidin-2-on-1-yl acetamide, comprising, (a) converting 4-benzyloxy-3-pyrrolin-2-on-1-yl acetamide of the formula:



by catalytic hydrogenolysis using a catalytic effective amount of a hydrogenolysis catalyst in the presence of hydrogen to the intermediate 2,4-dioxopyrrolidin-1-yl acetamide, and (b) reducing the intermediate 2,4-dioxopyrrolidin-1-yl acetamide with an alkali borohydride to the end product.

4,877,885

NOVEL 3-SULFINATOMETHYL-OR 3-SULFONATOMETHYL-4-SULFOMETHYL PYRROLIDINIUM BETAINES AND THEIR SALTS AS WELL AS PROCESS FOR MAKING THE SAME

Detlef Ballschuh; Horst Seibt; Roland Ohme; Jochen Rusche; Egon Gruendemann, and Elke Krause, all of Berlin, German Democratic Rep., assignors to Akademie Der Wissenschaften Der DDR, Berlin, German Democratic Rep.

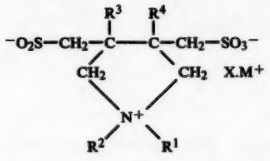
Continuation of Ser. No. 748,156, Jun. 24, 1985, abandoned. This application Apr. 2, 1987, Ser. No. 35,254

Claims priority, application German Democratic Rep., Apr. 26, 1985, 275642

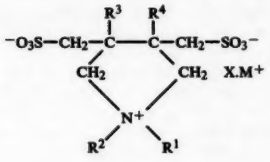
Int. Cl.[4] C07D *209/96*

U.S. Cl. 548—570 **7 Claims**

1. 3-sulfinatomethyl- and 3-sulfonatomethyl-4-sulfomethyl-pyrrolidinium betaines of Formula Ia and Ib



Ia



Ib

wherein

(A) R^1 is

(a) hydrogen;

(b) selected from the group consisting of

(bi) unsubstituted C_1–C_{22} alkyl,

(bii) CH_2—CO—NH-alkyl, wherein alkyl is CH_3 to $C_{21}H_{43}$, and

(biii) $CH(CO—NH\text{-}alkyl)_2$, wherein alkyl is CH_3 to $C_{21}H_{43}$;

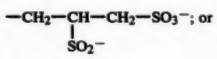
(c) 2-hydroxyethyl;

(d) $(CH_2—CH_2—O)_nH$ with n=1 to 10;

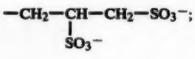
(e) benzyl;

(f) $—CH_2—CH_2—CH_2—SO_3^-$;

(g)



(h)



(B) R^2 is, independennt of R^1,

(a) hydrogen;

(b) selected from the group consisting of

(bi) unsubstituted C_1–C_{22} alkyl;

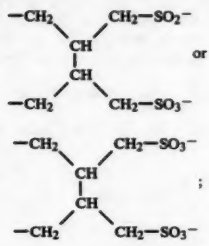
(bii) CH_2—CO—NH-alkyl, wherein alkyl is CH_3 to $C_{21}H_{43}$; and

(biii) $CH(CO—NH—alkyl)_2$, wherein alkyl is CH_3 to $C_{21}H_{43}$;

(c) 2-hydroxyethyl or

(d) $(CH_2—CH_2—O)_nH$ with n=1 to 10;

(C) R^1 and R^2 form together with the nitrogen atom a substituted hetereocyclic ring with 4 carbon atoms of the structure



(D) R^3 and R^4 are hydrogen or methyl;

(E) M+ is selected from the group consisting of Na, K, NH_4 and H; and

(F) X represents a whole number from 1 to 3.

4,877,886

PROCESS FOR THE PRODUCTION OF ALKYLENE CARBONATE

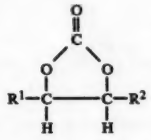
Bernard C. Ream, Charleston, W. Va., assignor to Union Carbide Chemicals and Plastics Company Inc., Danbury, Conn.

Filed Jun. 19, 1987, Ser. No. 63,977

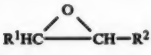
Int. Cl.[4] C07D *317/36, 317/38*

U.S. Cl. 549—230 **14 Claims**

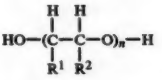
1. A process for the production of alkylene carbonate represented by the formula:



wherein R^1 and R^2 may be the same or different and are selected from the group consisting of hydrogen and alkyl of 1 to 6 carbons and R^1 and R^2 may form a cyclic structure, from alkylene oxide of the formula



and carbon dioxide comprising reacting the alkylene oxide with carbon dioxide under carbonate-forming conditions in the presence of catalyst comprising alkali or alkaline earth metal halide to produce alkylene carbonate and alkylene glycol of the formula



wherein n is 1 to about 8, said catalyst being soluble in said alkylene glycol; separating the alkylene carbonate from the alkylene glycol and catalyst to provide an alkylene glycol menstruum; contacting at least a portion of the alkylene glycol menstruum with sufficient acylating agent under acylating conditions to acylate the alkylene glycol and reduce the solubility of the catalyst in the alkylene glycol menstruum; and separating at least a portion of the catalyst from the acylated alkylene glycol menstruum.

4,877,887

PREPARATION OF ALKOXY MALEIC ANHYDRIDES

Rainer Becker, Bad Duerkheim, and Wolfgang Rohr, Wachenheim, both of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

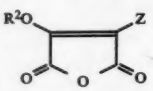
Filed May 2, 1988, Ser. No. 189,297

Claims priority, application Fed. Rep. of Germany, May 8, 1987, 3715344

Int. Cl.[4] C07D *307/56, 307/62*

U.S. Cl. 549—253 **2 Claims**

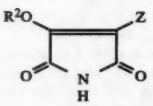
1. A process for the preparation of a maleic anhydride



II

where R^2 is C_1–C_4-alkyl, C_2–C_4-alkenyl, C_1–C_4-haloalkyl or C_2–C_4-haloalkenyl and Z is hydrogen, halogen or a radical OR^3, where R^3 is C_1–C_4-alkyl, C_2–C_4-alkenyl, C_1–C_4-haloalkyl or C_2–C_4-haloalkenyl, which comprises:

subjecting a maleimide



Ia

to alkaline hydrolysis at 0° to 100° C. and cyclizing the resulting maleic acid dianion in the presence of an acid to give the anhydride II; and

isolating said anhydride II which has been formed in the reaction mixture.

4,877,888

13-DEOXY-23-IMINO DERIVATIVES OF 13-DEOXY C-076-AGLYCONE COMPOUNDS

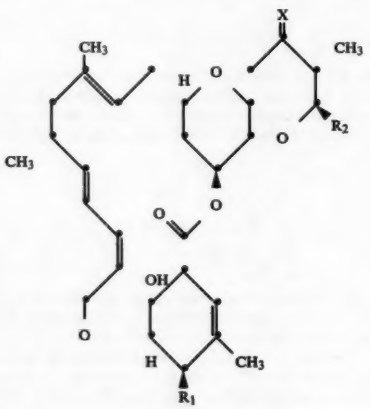
Goro Asato, Titusville, and Donald J. France, Pennington, both of N.J., assignors to American Cyanamid Company, Stamford, Conn.

Continuation-in-part of Ser. No. 907,259, Sep. 12, 1986, abandoned. This application Aug. 27, 1987, Ser. No. 88,952

Int. Cl.[4] C07D *311/68*

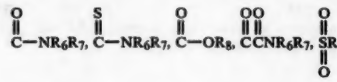
U.S. Cl. 549—264 **13 Claims**

1. A compound represented by structural formula (I):



(I)

wherein R_1 is methoxy or hydroxy; R_2 is isopropyl or sec-butyl; X is NOR_4, or N-NHR_5; R_4 is hydrogen, C_1–C_6alkyl, C_1–C_4alkoxymethyl, benzyl, allyl, propargyl, phenyl, CH_2COO-alkyl (C_1–C_4), N-(C_1–C_6 alkkyl)carbamoyl, N-(allyl)carbamoyl, N-(propargyl)carbamoyl, N-(phenyl)carbamoyl, N-(chlorophenyl)carbamoyl, N-(dichlorophenyl)carbamoyl, N-(benzyl)carbamoyl, C_1–C_6 alkanoyl, chloroacetyl, methoxyacetyl, phenylacetyl, optionally substituted on the phenyl ring with one or two halogens, C_1–C_4 alkyl groups, C_1–C_4 alkoxy groups or nitro groups, phenoxyacetyl, optionally substituted on the phenyl ring by one or two halogens, C_1–C_4 alkyl groups, C_1–C_4 alkoxy groups or nitro groups, or benzoyl, optionally substituted with one or two halogens, C_1–C_4 alkyl groups, C_1–C_4 alkoxy groups or nitro groups; R_5 is



C_1–C_6 alkanoyl, C_1–C_6 alkyl,

or benzoyl, optionally substituted with one or two halogens, C_1–C_4 alkyl groups, C_1–C_4 alkoxy groups or nitro groups; R_6 and R_7 are hydrogen or C_1–C_6 alkyl; or phenyl, optionally substituted with one or two halogens, C_1–C_4 alkyl, C_1–C_4 alkoxy, or phenyl optionally substituted with one or two halogens C_1–C_4 alkyl groups, C_1–C_4 alkoxy groups or nitro groups, R_8 is C_1–C_6 alkyl or phenyl optionally substituted with one or two halogens, C_1–C_4 alkyl groups, C_1–C_4 alkoxy groups or nitro groups; R_9 is C_1–C_6 alkyl or phenyl optionally substituted with one or two halogens, C_1–C_4 alkyl groups, C_1–C_4 alkoxy groups or nitro groups; or a pharmaceutically and pharmacologically acceptable salt thereof.

4,877,889

METHOD AND INSTALLATION FOR THE CRYSTALLIZATION OF GLUCONODELTALACTONE

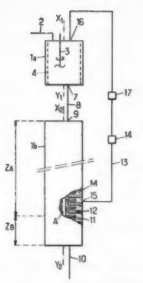
Jean-Bernard Leleu, and Patrick LeMay, both of Lestrem, France, assignors to Roquette Freres, Lestrem, France

Continuation of Ser. No. 863,144, May 14, 1986, abandoned. This application Sep. 6, 1988, Ser. No. 241,381

Claims priority, application France, May 15, 1985, 85 07433

Int. Cl.[4] C07D *309/30*

U.S. Cl. 549—292 **34 Claims**



1. Method of continuous crystallization of gluconodeltalactone, i.e. GDL, comprising the steps of

introducing into a first crystallisation zone a gluconic acid syrup of a richness in gluconic acid higher than 80%, of a

concentration in dry matter of 80 to 95% by weight and of a temperature of 60° to 85° C.,

causing said syrup to traverse under stirring said first crystallization zone and maintaining it within said zone at a substantially constant temperature less by 2° to 10° C. than the saturation temperature, due to which the starting of crystallization is produced which is manifested by the formation of a mixture of syrup and of GDL crystals, the average dwell time of a given fraction of the mixture inside the zone being from 10 to 30 hours, so that this mixture emerging from the first zone shows a concentration of crystals of 2 to 15%,

causing said mixture when emerging from the first zone to pass through, from top to bottom, under malaxation, a second crystallization zone, wherein a temperature gradient decreasing globally from top to bottom by 0.2° to 1° C./hour is imposed on the said mixture,

taking up at a level situated in the lower half of the second crystallization zone a fraction of the mixture traversing the said second zone, which fraction represents from 10 to 120% of the amount of syrup introduced into the first zone, the average dwell time of a given fraction of the mixture inside the second zone being from 40 to 80 hours,

recycling said fraction to the level of the upper end of the said first crystallization zone thus facilitating the starting of the crystallization inside the first zone, and

recovering the crystals from the mixture when emerging from the second zone in the vicinity of its lower end in the form of a crystalline mass rich in crystals.

4,877,890

VITAMIN E INTERMEDIATE

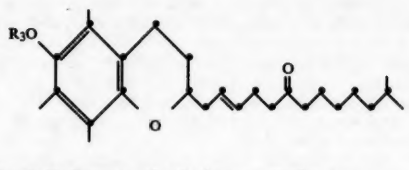
Noal Cohen, Montclair, N.J., assignor to Hoffmann-La Roche Inc., Nutley, N.J.

Division of Ser. No. 58,309, Jun. 5, 1987, Pat. No. 4,801,724. This application Oct. 17, 1988, Ser. No. 258,354

Int. Cl.[4] C07D *311/72*

U.S. Cl. 549—407 **4 Claims**

1. A compound of the formula:



wherein R_3 forms an ether hydroxy protecting group.

4,877,891

1,1-DIALKOXY- OR 1,1-(ALPHA, OMEGA-METHYLENEDIOXY)-NON-2-YN-9-01 AND THEIR OH-PROTECTED DERIVATIVES

Rainer Becker, Bad Durkheim; Walter Seufert, Speyer; Ernst Buschmann, and Christiane Brüchner, both of Ludwigshafen, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

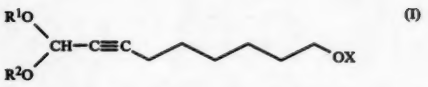
Filed Aug. 5, 1988, Ser. No. 228,681

Claims priority, application Fed. Rep. of Germany, Aug. 8, 1987, 3726511

Int. Cl.[4] C07D *309/10*; C07C *43/303*

U.S. Cl. 549—416 **1 Claim**

1. A 1,1-dialkoxy- or 1,1-(α,ω-methylenedioxy)-non-2-yn-9-ol or its OH-protected derivative of the formula I



(I)

where R^1 and R^2 are each C_1–C_6-alkyl or together form an alkylene chain of 2 to 5 carbon atoms and X is hydrogen or a protective group which can be eliminated.

4,877,892

CHIRAL GLYCIDYL AZIDES AS SYNTHETIC INTERMEDIATES TO OPTICALLY ACTIVE COMPOUNDS

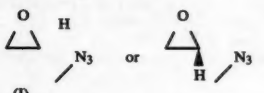
David R. Brittelli, Nottingham, Pa., assignor to E. I. Du Pont De Nemours and Company, Wilmington, Del.

Filed Dec. 3, 1987, Ser. No. 128,287

Int. Cl.[4] C07D *303/36*

U.S. Cl. 549—552 **1 Claim**

1. A chiral glycidyl azide of the formula:



(I) (II)

each said chiral azide of formula (I) or (II) being substantially free of the other chiral azide.

4,877,893

PROCESS FOR THE PREPARATION OF 2-(O-ALKYL)-2-THIO-1,3,2-OXATHIOPHOSPHOLANES

Neu József; Imre Csatlós; András Varga, all of Hódmezövásárhely; Róbert Surányi, Szeged; Zoltán Ilovai; Sándor Gaál, both of Hódmezövásárhely; József Karsai, Velence; Endre Sebestyén, Agárd; Éva Gárdi, Budapest; Károly Siki, Székesfehérvár; István Tóth, Miskolc; Guszt/e,acu/a/ v Gál, Sajóbábony; Zsolt Dombay, Miskolc; Mrs. Erzsébet Grega née Tóth, Miskolc; Csaba Pavliscsák, Sajóbábony; Gyula Tarpai, Miskolc; Péter Bonnyay, Miskolc, and Pál Sántha, Miskolc, all of Hungary, assignors to Eszakmagyarorszagi Vegyimuvek, Sajobabony, Hungary

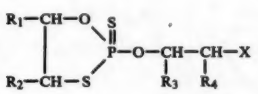
Filed Apr. 15, 1988, Ser. No. 181,778

Claims priority, application Hungary, Apr. 15, 1987, 1650/87

Int. Cl.[4] C07F *9/21*

U.S. Cl. 558—86 **5 Claims**

1. A process for the preparation of a compound of the Formula (I)



(I)

wherein

R_1, R_2, R_3, and R_4 independently from each other stand for hydrogen, C_1 to C_6 alkyl C_2 to C_6 alkenyl or C_2 to C_6 alkynyl; and

X is hydrogen, halogen, C_1 to C_6 alkyl, or mercapto; which comprises the steps of:

(a) reacting phosphorous pentasulfide in an organic solvent at a temperature between 20° C. and 100° C. with a compound of the Formula (II)

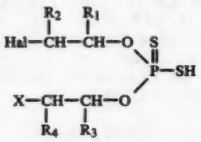
(II)

and a compound of the Formula (III)

(III)

wherein

Hal is chlorine or bromine, to obtain a compound of the Formula (IV)



(IV)

(b) treating the compound of the Formula (IV) with a base at a temperature between 60° C. and 80° C. to obtain a compound of the Formula (I); and

(c) isolating the compound of the Formula (I).

4,877,894

HYDROCARBON GELLER AND METHOD FOR MAKING THE SAME

David A. Huddleston, Sugar Land, Tex., assignor to Nalco Chemical Company, Sugar Land, Tex.

Filed Jan. 11, 1988, Ser. No. 142,703
Int. Cl.[4] C07F 9/00
U.S. Cl. 558—113 **6 Claims**

1. A hydrocarbon gelling agent comprising the reaction product of (1) a polyphosphate intermediate produced by reacting triethyl phosphate and phosphorous pentoxide and (2) a mixed alcohol comprising from about 13% to about 92% by weight hexanol.

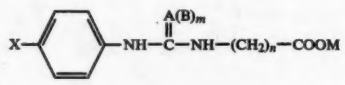
4,877,895

GLYCINE AND β ALANINE DERIVATIVES AS SWEETENING AGENTS

Claude Nofre, Lyons; Jean M. Tinti, Meyzieu, and Farroudja O. Chatzopoulos, Saint Etienne, all of France, assignors to Universite Claude Bernard - Lyon 1, France

Filed Mar. 4, 1986, Ser. No. 836,071
Claims priority, application France, Mar. 19, 1985, 85 04242
Int. Cl.[4] C07C 121/52
U.S. Cl. 558—413 **7 Claims**

1. Sweetening agents, characterized in that they respond to the following general formula:



wherein:

A is an imino (=N—), iminium (=N<), methylene (=C,) group, the iminium group being able to be salified by a chloride ion;

m is a number equal to 1 when A is an imino group and is equal to 2 when A is a methylene or iminium group;

n is a number equal to 1 or 2;

B:

when n=1, represents H, CN, OCH_3, NO_2, SO_2R, wherein R is an alkyl, cycloalkyl or aryl group having up to 10 carbon atoms, or such a group wherein 1 or 2 carbon atoms are substituted by 1 or 2 sulfur or oxygen atoms;

when n=2, represents H, CN, OCH_3;

X:

represents CN, NO_2, when B is H, CN, or OCH_3;

represents CN, NO_2, $COCH_3$, Cl, F, H, when B is NO_2, or SO_2R;

M is a hydrogen atom or a physiologically acceptable organic or inorganic cation.

4,877,896

SULFOAROYL END-CAPPED ESTER OF OLIGOMERS SUITABLE AS SOIL-RELEASE AGENTS IN DETERGENT COMPOSITIONS AND FABRIC-CONDITIONER ARTICLES

Rene Maldonado, Holland, Pa.; Toan Trinh, Maineville, and Eugene P. Gosselink, Cincinnati, both of Ohio, assignors to The Procter & Gamble Company, Cincinnati, Ohio

Filed Oct. 5, 1987, Ser. No. 105,421
Int. Cl.[4] C07C 143/525
U.S. Cl. 560—14 **28 Claims**

1. A water-soluable or water-dispersible, oligomeric or polymeric composition which comprises from about 25% to 100% of a substantially linear, sulfoaroyl end-capped ester having molecular weight ranging from about 500 to about 20,000; wherein said ester consists essentially of, on a molar basis,

(i) from about 1 to about 2 moles of sulfobenzoyl end-capping units of the formula $(MO_3S)(C_6H_4)C(O)$— wherein M is a salt-forming cation;

(ii) from about 2 to about 50 moles of oxy-1,2-propyleneoxy units or mixtures thereof with oxyethyleneoxy units provided that the oxy-1,2-propyleneoxy: oxyethyleneoxy mole ratio is in the range from about 1:10 to about 1.0; and

(iii) from about 1 to about 40 moles of terephthaloyl units provided that the mole ratio of said units identified by (ii) and (iii) is from about 2:1 to about 1:24; and which further optionally comprises, per mole of said ester,

(iv) from 0 to about 30 moles of 5-sulfoisophthaloyl units of the formula $—(O)C(C_6H_3)(SO_3M)C(O)$— wherein M is a salt-forming cation; or

(v) from 0 to about 25 moles of poly(oxyethylene)oxy units of the formula $—(OCH_2CH_2)_nO$— wherein the average degree of ethoxylation n ranges from 2 to about 100; or

(vi) from 0 to about 30 moles of a mixture of said units (iv) and (v) at a (iv):(v) mole ratio of from about 29:1 to about 1:29;

provided that when said ester consists essentially of said units identified by (i), (ii), and (iii), the content of said terephthaloyl units ranges from about 1 mole to about 8 moles; when said ester consists essentially of said units identified by (i), (ii), (iii) and (iv), the content of said 5-sulfoisophthaloyl units ranges from about 0.05 moles to about 18 moles; when said ester consists essentially of said units identified by (i), (ii), (iii), and (v), the content of said poly(oxyethylene)oxy units ranges from about 0.05 moles to about 10 moles; and further provided that when said ester consists essentially of said units identified by (i), (ii) and (iii) together with said units identified by said mixture (vi) of said units (iv) and (v), the content of said units identified by (iv) and (v) together ranges from about 0.1 moles to about 20 moles.

4,877,897

4-TRIFLUOROMETHYL-4'-NITRODIPHENYL ETHERS

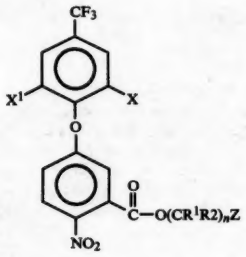
Colin Swithenbank, Perkasie, and Ted. T. Fujimoto, Churchville, both of Pa., assignors to Rohm and Haas Company, Philadelphia, Pa.

Division of Ser. No. 386,455, Jun. 8, 1982, which is a continuation of Ser. No. 149,618, May 14, 1980, abandoned, which is a continuation-in-part of Ser. No. 47,654, Jun. 11, 1979, abandoned. This application Nov. 10, 1982, Ser. No. 440,700

Int. Cl.[4] C07C *79/46*

U.S. Cl. 560—021 11 Claims

1. A compound of the formula



wherein X is hydrogen, halo, trihalomethyl, alkyl, cyano, or nitro; X^1 is hydrogen, halo or trifluoromethyl; R^1 and R^2 are the same or different radicals selected from hydrogen, lower alkyl, phenyl or benzyl; n is an integer of from 1 to 5; and Z is nitro.

4,877,898

PROCESS FOR ONE STEP ESTERIFICATION USING AN INTERMETALLIC PALLADIUM BASED CATALYST SYSTEM

Christos Paparizos, Willowick; Wilfrid G. Shaw, Lyndhurst, and James L. Callahan, Wooster, all of Ohio, assignors to The Standard Oil Company, Cleveland, Ohio

Continuation of Ser. No. 724,533, Apr. 18, 1985, abandoned. This application Jun. 12, 1986, Ser. No. 873,428

Int. Cl.[4] C07C *67/39*

U.S. Cl. 560—208 9 Claims

1. A process for the one step esterification of aldehydes and alcohols comprising the steps of:

combining an aldehyde with an alcohol, in the presence of oxygen and in contact with a catalyst having the general formula

$$PdTe_aZn_d$$

where a and d are from 0.25 to 3.

4,877,899

NOVEL COMPOSITIONS

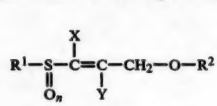
Robert L. Carney, Palo Alto, and Thomas L. Brown, Modesto, both of Calif., assignors to Sandoz Ltd., Basle, Switzerland

Filed Nov. 23, 1983, Ser. No. 554,733

Int. Cl.[4] C07C *67/02*

U.S. Cl. 560—262 20 Claims

1. A compound of the following formula (A):



(A)

wherein,

n is zero, one or two;

R^1 is lower alkyl of 1–8 carbon atoms, lower haloalkyl of 1–8 carbon atoms, lower alkenyl of 2–8 carbon atoms, lower haloalkenyl of 2–8 carbon atoms, lower alkoxyalkyl of 2–10 carbon atoms or phenylalkyl;

R^2 is hydrogen, lower alkyl of 1–8 carbon atoms, lower haloalkyl of 1–8 carbon atoms, lower alkoxyalkyl of 2–10 carbon atoms, lower acylalkyl of 3–10 carbon atoms, lower alkenyl of 2–8 carbon atoms, lower haloalkenyl of 2–8 carbon atoms, lower alkynyl of 2–8 carbon atoms, lower acyl of 2–8 carbon atoms or lower alkoxycarbonyl of 2–8 carbon atoms;

X is hydrogen, lower alkyl of 1–8 carbon atoms, lower haloalkyl of 1–8 carbon atoms or halogen; and

Y is hydrogen or halogen; provided that:

(a) when n is zero R^1 is 3-methyl-2-butenyl, R^2 is hydrogen and Y is hydrogen, then X is other than methyl; or

(b) when R^2 is hydrogen or lower acyl and Y is hydrogen, then X is other than hydrogen.

4,877,900

PROCESS FOR PREPARING TEREPHTHALIC ACID OF HIGH QUALITY

Akio Tamaru, and Yoshiaki Izumisawa, both of Kitakyushu, Japan, assignors to Mitsubishi Chemical Industries Limited, Tokyo, Japan

Filed Apr. 5, 1988, Ser. No. 177,951

Claims priority, application Japan, Apr. 24, 1987, 62-101373

Int. Cl.[4] C07C *51/265*

U.S. Cl. 562—413 19 Claims

1. A process for preparing terephthalic acid of high quality which comprises:

oxidizing p-xylene with molecular oxygen in an acetic acid solvent in the presence of a catalyst comprised of at least one heavy metal and bromine at a temperature of from 180° to 230° C. to convert at least 95 wt % of the p-xylene into terephthalic acid and, optionally, subjecting the resultant reaction mixture to low temperature post-oxidation with molecular oxygen at temperatures lower than the temperature of the first oxidation reaction, thereby obtaining a slurry containing terephthalic acid particles whose spectral reflectance defined below is not less than 70% and whose reflectance ratio (400/500) defined below is not less than 0.92;

subjecting the slurry to high temperature post-oxidation with molecular oxygen at a temperature of from 235° to 290° C. and then to crystallization; and collecting the resultant terephthalic acid from the reaction mixture.

4,877,901

PROCESS FOR SYNTHESIZING N,N'-DITHIOBIS(SULFONAMIDES)

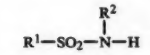
Roger J. Hopper; Niranjan V. Shah, both of Akron, and Steven M. Ryba, Norton, all of Ohio, assignors to The Goodyear Tire & Rubber Company, Akron, Ohio

Filed Oct. 28, 1988, Ser. No. 263,836

Int. Cl.[4] C07C *143/75*

U.S. Cl. 564—82 14 Claims

1. A process for synthesizing N,N'-dithiobis(sulfonamides) comprising reacting a sulfonamide of the formula:



with sulfur monochloride and caustic in a mixed organic-aqueous media, wherein R^1 and R^2 are independently selected from the group consisting of alkyl radicals having 1 to 20 carbon atoms, cycloalkyl radicals having 5 to 20 carbon atoms, phenyl radicals and alkaryl radicals having 7 to 20 carbon atoms, and haloaryl radicals having about 6 to about 10 carbon atoms and where R^1 is also selected from radicals having the formula:

wherein R^3 and R^4 are individually selected from said alkyl, cycloalkyl, phenyl, alkaryl and haloaryl radicals and wherein R^3 and R^4 can be joined together to represent radicals selected from $—CH_2—_n$, where n is an integer of 4 to 7 and $—CH_2)_2O—CH_2—_2$.

4,877,902

POLYTHIOBISPHENOL PROCESS

Vincent J. Gatto, Baton Rouge, La., assignor to Ethyl Corporation, Richmond, Va.

Filed Mar. 14, 1988, Ser. No. 167,876

Int. Cl.[4] C07C *148/02*

U.S. Cl. 568—23 **20 Claims**

1. A process for making a 4,4'-polythiobis(2,6-dialkylphenol), said process comprising reacting a 2,6-dialkylphenol with S_2Cl_2 in a nitroalkane solvent at $-10°$ to 30° C. to form a mixture of mainly 4,4'-dithiobis and 4,4'-trithiobis(2,6-dialkylphenol).

4,877,903

CYCLOHEXANOL/CYCLOHEXANONE MIXTURES PRODUCED FROM CYCLOHEXANE

Michel Costantini, Lyons, and Francoise Igersheim, Villeurbanner, both of France, assignors to Rhone-Poulenc Chimie, Courbevoie, France

Continuation of Ser. No. 106,773, Oct. 13, 1987, abandoned. This application Nov. 14, 1988, Ser. No. 271,346

Claims priority, application France, Oct. 10, 1986, 86 14282

Int. Cl.[4] C07C *45/33*

U.S. Cl. 568—342 **16 Claims**

1. A process for the preparation of a cyclohexanol/cyclohexanone admixture, comprising oxidizing cyclohexane in air, at a temperature of from about 80° C. to 160° C., and concomitantly decomposing cyclohexyl hydroperoxide thus formed, in the presence of a catalytically effective amount of (i) manganese or compound thereof, (ii) a Brönsted acid having a pK_a of at least 0.7, and (iii) a pyridine ligand.

4,877,904

BICYCLIC KETONES AS ODORANTS AND FLAVORANTS

Peter Naegeli, Wettingen, Switzerland, assignor to Givaudan Corporation, Clifton, N.J.

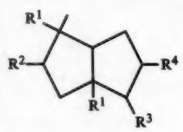
Filed Sep. 9, 1987, Ser. No. 94,560

Claims priority, application Switzerland, Sep. 18, 1986, 3740/86

Int. Cl.[4] C07C *49/21*

U.S. Cl. 568—374 **8 Claims**

1. A compound of the formula



wherein:

R^1 represents methyl or ethyl,

R^2 represents hydrogen or methyl,

the dotted line represents an optional carbon-carbon bond,

R^3 is hydrogen and R^4 represents acetyl or propionyl.

4,877,905

POLYETHER COMPOUNDS AND THEIR PREPARATION

Richard D. Chambers, 5 Aykley Green, Whitesmocks, Durham City, England (DH1 4LM)

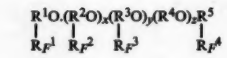
Filed May 28, 1987, Ser. No. 55,023

Claims priority, application United Kingdom, May 28, 1986, 8612983

Int. Cl.[4] C07L *43/11, 43/12*

U.S. Cl. 568—615 **5 Claims**

1. A substituted polyether intermediate of the general formula



wherein the symbols R^1, R^2, R^3, R^4 and R^5 each represent an alkyl group containing from 1 to 4 carbon atoms, which alkyl groups may differ, the symbols R_F^1, R_F^2, R_F^3 and R_F^4 each represent fluorine-containing hydrocarbon groups containing from 2 to 6 carbon atoms, which hydrocarbon groups may differ, x is an integer and each of y and z is zero or an integer, and the sum of x, y and z is at least 2 and not greater than 100.

4,877,906

PURIFICATION OF POLYOLS PREPARED USING DOUBLE METAL CYANIDE COMPLEX CATALYSTS

Stephen D. Harper, West Chester, Pa., assignor to Arco Chemical Technology, Inc., Wilmington, Del.

Filed Nov. 25, 1988, Ser. No. 276,275

Int. Cl.[4] C07C *41/34, 41/44*

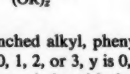
U.S. Cl. 568—621 **38 Claims**

1. A process for purifying a polyol containing a double metal cyanide complex catalyst which comprises the steps of:

(a) treating the polyol with at least one alkali metal compound selected from the group consisting of alkali metals, alkali metal hydroxides, alkali metal hydrides, and alkali metal alkoxides in an amount sufficient to convert the double metal cyanide complex catalyst into an insoluble portion and a soluble portion and to convert at least a portion of the polyol hydroxyl groups to alkoxide groups,

(b) filtering the treated polyol to remove the insoluble portion,

(c) further treating the filtered polyol with a sufficient amount of at least one phosphorous compound to convert the soluble portion of the double metal cyanide complex catalyst produced in step (a) to a second insoluble portion, said phosphorous compound selected from the group consisting of pyrophosphorous acid, hypophosphorous acid, phosphorous acid, and compounds having the formula



wherein R is linear or branched alkyl, phenyl, or substituted phenyl, X is Cl or Br, x is 0, 1, 2, or 3, y is 0, 1, or 2, z is 0, 1, 2, or 3, and the sum of x+y+z is 3, with the proviso that the filtered polyol additionally be treated with water when the phosphorous compound is pyrophosphorous acid or when x is 1, 2, or 3, or z is 1, 2, or 3,

(d) filtering the phosphorous compound-treated polyol to remove the second insoluble portion of the double metal cyanide complex catalyst produced in step (c), and

(e) recovering the resulting purified polyol

4,877,907

PREPARATION PROCESS OF 4,4'-BIPHENOL, PRECURSOR OF SAME AND PREPARATION PROCESS OF PRECURSOR

Tohru Miura; Teruyuki Nagata; Koju Okazaki; Masayuki Furuya, and Emiko Nishida, all of Ohmuta, Japan, assignors to Mitsui Toatsu Chemicals, Incorporated, Tokyo, Japan

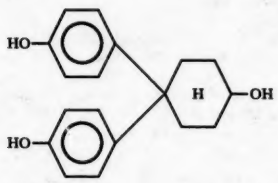
Division of Ser. No. 178,301, Apr. 6, 1988. This application Apr. 14, 1989, Ser. No. 338,206

Claims priority, application Japan, Apr. 14, 1987, 62-89890; Dec. 18, 1987, 62-318701

Int. Cl.[4] C07C 39/17

U.S. Cl. 568—721 1 Claim

1. A preparation process of 4-(4-hydroxyphenyl)-3-cyclohexene-1-ol which comprises conducting a thermal decomposition reaction of 4,4-bis(4-hydroxyphenyl)cyclohexanol having the formula (II):



(II)

in the absence of a dehydrogenation catalyst and of a hydrogen acceptor.

4,877,908

CHIRAL PHOSPHORUS COMPOUNDS, A PROCESS FOR THEIR MANUFACTURE AND THEIR APPLICATION TO THE CATALYSIS OF ENANTIOSELECTIVE SYNTHESIS REACTIONS

Michele Petit, Wasquehal; Andre Mortreux, Hem; Francis Petit, Wasquehal, and Gerard Buono, Marseille, all of France, assignors to Norsolor, Paris, France

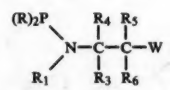
Continuation of Ser. No. 698,412, Feb. 5, 1983, abandoned, which is a continuation-in-part of Ser. No. 638,268, Aug. 6, 1984, abandoned. This application Oct. 13, 1987, Ser. No. 107,919

Claims priority, application France, Aug. 5, 1983, 83 12983

Int. Cl.[4] C07C 27/00

U.S. Cl. 568—814 32 Claims

1. A method of using an aminophosphine-phosphinite chiral ligand of the formula



wherein:

W is $OP(R_2)$;

R is a hydrocarbon radical selected from the group consisting of alkyl, aryl and cycloalkyl radicals;

R_1 is selected from the group consisting of a hydrogen atom and hydrocarbon radicals;

R_3 and R_4, which must be different from one another, are selected from the group consisting of a hydrogen atom and hydrocarbon radicals that may or may not carry at least one functional group selected from the group consisring of the alcohol, thiol, thioether, amine, imine, acid, ester, amide, and ether functional groups; and

R_5 and R_6 are selected from the group consisting of a hydrogen atom and hydrocarbon radicals that may or may not contain functional groups, in a reaction for the synthesis of optically active organic compounds, comprising reacting one or more organic compounds that do not possess a center of asymmetry with (A) one or more transition metal complexes of the formula MZq, wherein M is a metal of group VIII of the Periodic Table, q is the degree of coordination of the metal M, and Z is an atom or molecule capable of complexing the metal M and (B) one or more such chiral ligands to form said optically active organic compound, wherein said synthesis reaction is selected from the group consisting of the hydroformylation reaction of unsaturated organic substrates at a temperature of between 15° and 300° C. and under a pressure of between 1 and 350 bars, the hydrosilylation reaction of ketones or imines, and the cyclodimerization and dimerization reactions of conjugated dienes and the codimerization reactions of ethylene and a conjugated diene at a temperature of between −30° and +100° C. and under a pressure of less than 100 bars.

14. A method as claimed in claim 1, wherein the synthesis reaction is a hydrosilylation reaction of ketones or imines.

4,877,909

PROCESS FOR REDUCING ALDEHYDES OR KETONES

Sigenobu Mizusaki; Hajime Matsushita; Shigeo Ishiguro; Hiroshi Ichinose, all of Yokohama, and Akira Izumi, Kyoto, all of Japan, assignors to Japan Tobacco, Inc., Tokyo, Japan

PCT No. PCT/JP86/00460, § 371 Date Feb. 22, 1988, § 102(e) Date Feb. 22, 1988, PCT Pub. No. WO88/01995, PCT Pub. Date Mar. 24, 1988

PCT Filed Sep. 10, 1986, Ser. No. 126,106

Int. Cl.[4] C07C 29/132, 29/14

U.S. Cl. 568—880 19 Claims

1. Process for reducing an aldehyde or ketone to the corresponding alcohol, which comprises reacting at a temperature of about 70° to 200° C. an aldehyde or ketone selected from the group consisting of unsubstituted aliphatic or aromatic aldehydes and ketones, with isopropyl alcohol in the presence of a solid catalyst, prepared by partially dehydrating zirconium oxide to form said catalyst, to reduce directly the aldehyde or ketone and thereby form the corresponding alcohol from the aldehyde or ketone.

4,877,910

PROCESS FOR PREPARING POLYALKYL TETRAHYDRONAPHTHALENES

Walter C. Frank, Holland, Pa., assignor to Union Camp Corporation, Wayne, N.J.

Filed Jan. 27, 1989, Ser. No. 303,366

The portion of the term of this patent subsequent to Oct. 31, 2006, has been disclaimed.

Int. Cl.[4] C07C 12/00, 12/64, 2/64

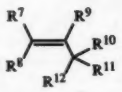
U.S. Cl. 585—411 55 Claims

1. A process for producing a polyalkyl tetrahydronaphthalene compound comprising contacting a partially substituted benzene compound, wherein said benzene compound is substituted with two or more substitutents that do not substantially interfere with a Friedel-Crafts-type alkylation reaction said substituents including at least one secondary alkyl group having only one alpha-hydrogen, and wherein said benzene

compound is unsubstituted in at least one position adjacent to said secondary alkyl group, with an olefinic compound of the Formula

[VI]

in the presence of a reagent of the Formula



[VII]

provided that said reagent has greater electron releasing properties than said olefinic compounds,

an alkyl halide or a hydrogen halide, and

a Lewis acid, wherein

R^4, R^5, R^6, R^7, R^8, R^9, R^{10}, R^{11} and R^{12}, independently, are substituents that do not substantially interfere with a Friedel-Crafts-type alkylation reaction, provided that

(i) R^5 and R^6 are each other than H,

(ii) no more than one of R^7, R^8 and R^9 are H, and

(iii) no more than one of R^{10}, R^{11} and R^{12} are H, wherein said process is carried out in the substantial absence of elemental iodine.

4,877,911

PROCESS FOR PREPARING POLYALKYL TETRAHYDRONAPHTHALENES

Walter C. Frank, Holland, Pa., assignor to Union Camp Corporation, Wayne, N.J.

Filed Jan. 27, 1989, Ser. No. 303,422

The portion of the term of this patent subsequent to Oct. 31, 2006, has been disclaimed.

Int. Cl.[4] C07C *12/00, 12/64, 2/64*

U.S. Cl. 585—411 **38 Claims**

1. A process for producing a polyalkyl tetrahydronaphthalene compound comprising contacting a partially substituted benzene compound, wherein said benzene compound is substituted with two or more substituents that do not substantially interfere with a Friedel-Crafts-type alkylation reaction said substituents including at least one secondary alkyl group having only one alpha-hydrogen, and wherein said benzene compound is unsubstituted in at least one position adjacent to said secondary alkyl group, with an olefinic compound of the Formula

[VI]

wherein R^4, R^5, R^6, and R^7, independently, are substituents that do not substantially interfere with a Friedel-Crafts-type alkylation reaction, provided that R^5, R^6 and R^7 are each other than H, in the presence of

an alkyl halide,

a Lewis acid, and

a phase transfer agent.

4,877,912

PROCESS FOR PREPARING 1,1,3,4,4,6-HEXAMETHYL-1,2,3,4-TETRAHYDRONAPHTHALENE

Walter C. Frank, Holland, Pa., assignor to Union Camp Corporation, Wayne, N.J.

Filed Jan. 27, 1989, Ser. No. 303,356

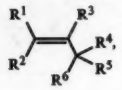
The portion of the term of this patent subsequent to Oct. 31, 2006, has been disclaimed.

Int. Cl.[4] C07C *12/00, 12/64, 2/64*

U.S. Cl. 585—411 **10 Claims**

1. A process for producing 1,1,3,4,4,6-hexamethyl-1,2,3,4,-tetrahydronaphthalene comprising contacting para-cymene with 2,3-dimethyl-1-butene in the presence of

a reagent of the Formula



aluminum halide, and I_2,

wherein

R^1, R^2, R^3, R^4, R^5 and R^6, independently, are a

a H or C_1–C_3 straight chain, or branched alkyl, provided that

(i) no more than one of R^1, R^2, and R^3 are H, and

(ii) no more than one of R^4, R^5 and R^6 are H.

4,877,913

PROCESS FOR PREPARING POLYALKYL TETRAHYDRONAPHTHALENES

Walter C. Frank, Holland, Pa., assignor to Union Camp Corporation, Wayne, N.J.

Filed Jan. 27, 1989, Ser. No. 303,355

The portion of the term of this patent subsequent to Oct. 31, 2006, has been disclaimed.

Int. Cl.[4] C07C *12/00, 12/64, 2/64*

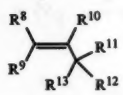
U.S. Cl. 585—411 **50 Claims**

1. A process for producing a polyalkyl tetrahydronaphthalene compound comprising contacting a partially substituted benzene compound, wherein said benzene compound is substituted with two or more substituents that do not substantially interfere with a Friedel-Crafts-type alkylation reaction said substituents including at least one secondary alkyl group having only one alpha-hydrogen, and wherein said benzene compound is unsubstituted in at least one position adjacent to said secondary alkyl group, with an olefinic compound of the Formula

[VI]

in the presence of

a reagent of the Formula



[VII]

provided that said reagent has greater electron releasing properties than said olefinic compounds, and

a Lewis acid, wherein

R^4, R^5, R^6, R^7, R^8, R^9, R^{10}, R^{11}, R^{12} and R^{13}, independently, are substituents that do not substantially interfere with a Friedel-Crafts-type alkylation reaction, provided that

(i) R^5, R^6 and R^7 are each other than H,

(ii) no more than one of R^8, R^9 and R^{10} are H, and
(iii) no more than one of R^{11}, R^{12} and R^{13} are H, wherein said process is carried out in the substantial absence of elemental iodine.

4,877,914
PROCESS FOR PREPARING POLYALKYL TETRAHYDRONAPHTHALENES
Walter C. Frank, Holland, Pa., assignor to Union Camp Corporation, Wayne, N.J.
Filed Jan. 27, 1989, Ser. No. 303,419
The portion of the term of this patent subsequent to Oct. 31, 2006, has been disclaimed.
Int. Cl.[4] C07C *12/00, 12/64, 2/64*
U.S. Cl. 585—411 **38 Claims**

1. A process for producing a polyalkyl tetrahydronaphthalene compound comprising contacting a partially substituted benzene compound, wherein said benzene compound is substituted with one or more substituents that do not substantially interfere with a Friedel-Crafts-type alkylation reaction said substituents including at least one secondary alkyl group having only one alpha-hydrogen, and wherein said benzene compound is unsubstituted in at least one position adjacent to said secondary alkyl group, with an olefinic compound of the formula

[VI]

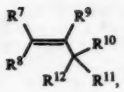
wherein R^4, R^5 and R^6, independently, are substituents that do not substantially interfere with a Friedel-Crafts-type alkylation reaction, provided that R^5 and R^6 are each other than H, in the presence of
an alkyl halide,
a Lewis acid, and
a phase transfer agent.

4,877,915
PROCESS FOR PREPARING POLYALKYL TETRAHYDRONAPHTHALENES
Walter C. Frank, Holland, Pa., assignor to Union Camp Corporation, Wayne, N.J.
Filed Jan. 27, 1989, Ser. No. 303,364
The portion of the term of this patent subsequent to Oct. 31, 2006, has been disclaimed.
Int. Cl.[4] C07C *12/00, 12/64, 2/64*
U.S. Cl. 585—411 **48 Claims**

1. A process for producing a polyalkyl tetrahydronaphthalene compound comprising contacting a partially substituted benzene compound, wherein said benzene compound is substituted with two or more substituents that do not substantially interfere with a Friedel-Crafts-type alkylation reaction said substituents including at least one secondary alkyl group having only one alpha-hydrogen, and wherein said benzene compound is unsubstituted in at least one position adjacent to said secondary alkyl group, with an olefinic compound of the Formula

[VI]

in the presence of a reagent of the Formula


[VII]

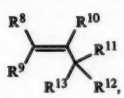
provided that said reagent has greater electron releasing properties than said olefinic compounds, and
a Lewis acid,
wherein
R^4, R^5, R^6, R^7, R^8, R^9, R^{10}, R^{11} and R^{12}, independently, are substituents that do not substantially interfere with a Friedel-Crafts-type alkylation reaction, provided that
(i) R^5 and R^6 are each other than H,
(ii) no more than one of R^7, R^8 and R^9 are H, and
(iii) no more than one of R^{10}, R^{11} and R^{12} are H,
wherein said process is carried out in the substantial absence of elemental iodine.

4,877,916
PROCESS FOR PREPARING POLYALKYL TETRAHYDRONAPHTHALENES
Walter C. Frank, Holland, Pa., assignor to Union Camp Corporation, Wayne, N.J.
Filed Jan. 27, 1989, Ser. No. 303,365
The portion of the term of this patent subsequent to Oct. 31, 2006, has been disclaimed.
Int. Cl.[4] C07C *12/00, 12/64, 2/64*
U.S. Cl. 585—411 **55 Claims**

1. A process for producing a polyalkyl tetrahydronaphthalene compound comprising contacting a partially substituted benzene compound, wherein said benzene compound is substituted with two or more substituents that do not substantially interfere with a Friedel-Crafts-type alkylation reaction said substituents including at least one secondary alkyl group having only one alpha-hydrogen, and wherein said benzene compound is unsubstituted in at least one position adjacent to said secondary alkyl group, with an olefinic compound of the Formula

[VI]

in the presence of a reagent of the Formula


[VII]

provided that said reagent has greater electron releasing properties than said olefinic compounds,
an alkyl halide or a hydrogen halide, and
a Lewis acid,
wherein
R^4, R^5, R^6, R^7, R^8, R^9, R^{10}, R^{11}, R^{12} and R^{13}, independently, are substituents that do not substantially interfere with a Friedel-Crafts-type alkylation reaction, provided that
(i) R^5, R^6 and R^7 are each other than H,
(ii) no more than one of R^8, R^9 and R^{10} are H, and
(iii) no more than one of R^{11}, R^{12} and R^{13} are H, wherein said process is carried out in the substantial absence of elemental iodine.

4,877,917

METHOD OF POLYMERIZING α,ω-DIYNES

Michael F. Farona, Cuyahoga Falls, and Ramji Srinivasan, Akron, both of Ohio, assignors to University of Akron, Akron, Ohio

Filed Oct. 17, 1988, Ser. No. 258,791
Int. Cl.[4] C07C *12/02*
U.S. Cl. 585—416 16 Claims

1. A method of reacting an α,ω-diyne to form products containing at least one of the class of dimers, timers and higher polymers comprising contacting said α,ω-diyne either as a sole reactant or together with an alkyne with a niobium catalyst or tantalum catalyst to effect formation of a benzo product characterized as highly soluble to insoluble in benzene at 25° C.

4,877,918

PROCESS FOR PREPARING INTERNAL OLEFINS

Gohfu Suzukamo, Ibaraki, and Masami Fukao, Shiga, both of Japan, assignors to Sumitomo Chemical Company, Ltd., Osaka, Japan

Filed Aug. 15, 1988, Ser. No. 232,231
Claims priority, application Japan, Dec. 16, 1987, 62-319294
Int. Cl.[4] C07C *5/23, 5/25*
U.S. Cl. 585—664 23 Claims

1. A process for isomerizing an olefin to an internal olefin in the presence of a solid base which comprises:

pretreating alumina with at least one salt selected from the group consisting of alkali metal carbonates and alkali metal aluminates so as to form pretreated alumina,

forming a solid base by heating an alkali metal hydride and said pretreated alumina in an atmosphere of an inert gas at a temperature of 200° to 450° C., and

isomerizing an unprocessed olefin to an internal olefin in the presence of said solid base at an isomerization temperature of from −30° to +120° C., wherein said solid base is present in an amount of from 1/3000 to 1/20 part by weight of unprocessed olefin.

4,877,919

BUTANE ISOMERIZATION IN THE PRESENCE OF C_5 AND C_6 HYDROCARBONS

Robert J. Schmidt, Rolling Meadows, Ill., assignor to UOP, Des Plaines, Ill.

Filed Apr. 25, 1988, Ser. No. 185,568
Int. Cl.[4] C07C *5/13*
U.S. Cl. 585—748 6 Claims

1. A process for isomerizing C_4 normal hydrocarbons in the presence of C_5 and C_6 normal hydrocarbons, said method comprising:

(a) charging a feed stream to a reaction zone, said feed stream comprising C_4–C_6 hydrocarbons and having at least 10 mol% C_4 hydrocarbons and at least 25 mol% C_5–C_6 hydrocarbons;

(b) adding hydrogen to said feed stream at a hydrogen to hydrocarbon ratio of less than 0.5;

(c) contacting said feed stream and hydrogen in said reaction zone with an isomerization catalyst consisting of alumina, 0.01 to 0.25 wt.% platinum and from 2 to 10 wt.% of a chloride component at isomerization conditions including a temperature in the range of from 200°–225° C. (392°–435° F.), a pressure of from 7 to 70 barsg and a space velocity of from 0.1 to 10;

(d) maintaining a chloride concentration in the reaction zone of from 30 to 300 ppm; and

(e) recovering an effluent stream from the reaction zone comprising an isomerate product stream having a C_4 isoparaffin/C_4 hydrocarbon ratio of at least 20%.

4,877,920

PROCESS FOR REMOVING ARSINE IMPURITIES IN PROCESS STREAMS

Richard A. Lush, Wilmington, Del., and Hsiang-Wei Tsao, West Chester, Pa., assignors to Sun Refining and Marketing Company, Philadelphia, Pa.

Filed Jun. 8, 1988, Ser. No. 203,847
Int. Cl.[4] C07C *7/12*
U.S. Cl. 585—823 9 Claims

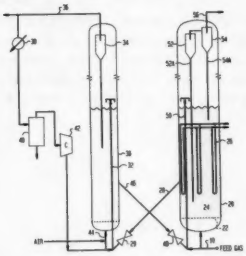
1. A process for reducing the arsenic content of a hydrocarbon-containing fluid which comprises contacting said fluid with copper oxide supported and activated carbon.

4,877,920

SINGLE ZONE OLIGOMERIZATION OF OLEFINS IN A SUPER-DENSE PHASE TURBULENT FLUID BED

Mohsen N. Harandi, 12 Catbird Ct., Lawrenceville, N.J. 08648, and Hartley Owen, 5 Riverview Ter., Belle Mead, N.J. 08502

Filed Apr. 20, 1988, Ser. No. 184,465
Int. Cl.[4] C07C *3/10, 3/20*
U.S. Cl. 585—533 22 Claims



1. A catalytic process for upgrading a C_2+ olefin feedstream to a heavier product stream rich in C_{10}+ aliphatic hydrocarbons, said process comprising,

(a) contacting said olefin feedstream with a finely divided medium pore zeolite metallosilicate catalyst having a silica:alumina ratio greater than 12, and a constraint index in the range from about 1 to about 12, maintained as a super-dense fluid-bed operating in a single zone turbulent regime at or above a pressure P_{max} and a temperature T_{max} at which there be no liquid phase present,

(b) flowing said olefin feedstream through said bed at a weight hourly space velocity (WHSV) in the range from about 0.05 to about 50 hr^{-1}, without forming a liquid phase in said bed,

(c) maintaining a catalyst fines content of from about 5% to about 20% by wt, based on the weight of the catalyst in the bed, said fines having a particle size less than 32 microns, and,

(d) recovering said C_{10}+ aliphatic hyrdocarbons from said product stream leaving said bed at or above said P_{max} and T_{max}.

4,877,922

COMPOSITION EASILY DYEABLE WITH SUBLIMABLE DESPERSE DYE

Isao Sasaki, Hiroshima; Kenji Kushi, Ohtake, and Nobuyoshi Taguchi, Ikoma, all of Japan, assignors to Mitsubishi Rayon Company, Ltd., Tokyo, Japan

Continuation of Ser. No. 94,293, Sep. 8, 1987, abandoned. This application Mar. 27, 1989, Ser. No. 330,936
Claims priority, application Japan, Sep. 10, 1986, 61-211731
Int. Cl.[4] C08G *63/60*
U.S. Cl. 528—272 26 Claims

1. A resin composition for a crosslinked coating film easily dyeable with a disperse dye, which comprises 100 parts by weight of a mixture composed of 40 to 95% by weight of a polyester resin and 5 to 60% of a crosslinking agent curable with active energy rays, and 0.01 to 12 parts by weight of at least one surface active agent selected from the group consisting of silicon-containing surface active agents and fluorine-containing surface active agents.

ELECTRICAL

4,877,923

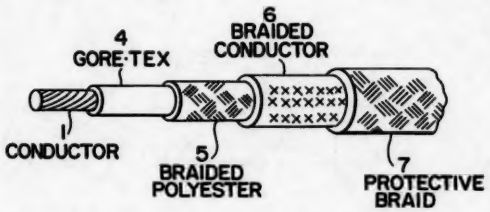
SENSORS FOR DETECTING AND LOCATING LIQUID LEAKS

Jack A. Sahakian, Flagstaff, Ariz., assignor to W. L. Gore & Associates, Inc., Newark, Del.

Continuation-in-part of Ser. No. 226,644, Aug. 1, 1988, abandoned. This application Aug. 17, 1988, Ser. No. 233,305

Int. Cl.[4] H01B *7/32*; H01G *7/00*; G01M *3/16*

U.S. Cl. 174—11 R **14 Claims**



10. A sensor cable for detecting liquid leakage which comprises:

a first and second electrical conductor each in substantially parallel relation to each other, said first conductor being a core conductor, said second conductor having a construction that is porous enough to permit passage of liquid chemicals,

a first insulation layer adjacent to said first conductor, said insulation being porous enough to permit passage of liquid chemicals, said insulation being hydrophobic so that it is impermeable to liquid water,

a second insulation layer positioned between said first insulation layer and said second conductor, said second insulation layer being water absorbent, and

a protective insulation cover that is porous enough to permit passage of water, said cover comprising the outer portion of the cable.

4,877,924

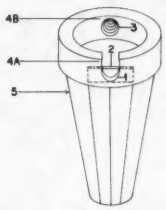
ELECTRIC WIRE CONNECTOR WITH BUILT-IN STRIPPER AND STRIP GAUGE

Harry Mitzmacher, 59-10 Queens Blvd., Woodside, N.Y. 11377

Filed Nov. 21, 1988, Ser. No. 273,933

Int. Cl.[4] H01R *4/22*; H02G *1/12*

U.S. Cl. 174—87 **2 Claims**



1. An electric wire connector, comprising: a hollow conically shaped body which is open at its large end for receiving wires to be connected and which is closed at its small end, a circular rim wall thicker than the wall of the conically shaped body extending around the large open end of the conically shaped body, a groove extending across the circular rim wall, and a sharp edged blade embedded in the circular rim wall and extending across the groove, a portion of the sharp edged blade being exposed at the groove for stripping insulation off wires to be connected by the wire connector.

4,877,925

MULTI-STAGE PUSH BUTTON SWITCH DEVICE

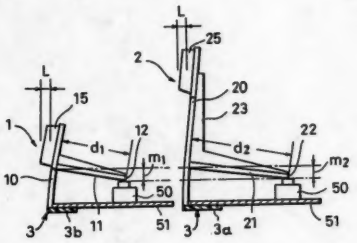
Shigetoshi Kobayashi, Tokyo, Japan, assignor to Clarion Co., Ltd., Tokyo, Japan

Filed Oct. 20, 1988, Ser. No. 260,380

Claims priority, application Japan, Oct. 23, 1987, 62-162401[U]; Oct. 23, 1987, 62-162403[U]

Int. Cl.[4] H01H *13/70*

U.S. Cl. 200—5 A **20 Claims**



1. A multi-stage push button switch device comprising:

a base portion;

a plurality of first push button members, each of which includes a first button portion and a first flexible arm portion extending from said first button portion approximately in a first direction, one end of each said first flexible arm portion remote from the first button portion being fixedly coupled to said base portion;

a plurality of second push button members, each of which includes a second button portion and a second flexible arm portion extending from said second button portion approximately in said first direction, one end of each said second flexible arm portion remote from the second button portion being fixedly coupled to said base portion, said second flexible arm portions being longer than said first flexible arm portions;

a plurality of first push switches and means for supporting each said first push switch stationarily with respect to said base portion at a location spaced in a second direction approximately perpendicular to said first direction from a respective one of said first push button members;

a plurality of second push switches and means for supporting each said second push switch stationarily with respect to said base portion at a location spaced in said second direction from a respective one of said second push button members, the distance between each said second push switch and the second flexible arm portion of the corresponding second push button member being greater than the distance between each said first push switch and the first flexible arm portion of the corresponding first push button member;

a first working piece projecting approximately in said second direction from each of said first push button members, each of said first working pieces having a portion which is spaced from the corresponding first flexible arm portion and which, when the corresponding button portion is manually pushed in approximately said second direction, is moved approximately in said first direction and engages and actuates a respective said first push switch; and

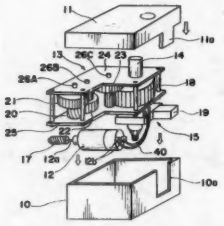
a second working piece projecting approximately in said second direction from each of said second push button members, each of said second working pieces having a portion which is spaced from the corresponding second flexible arm portion and which, when the corresponding button portion is manually pushed approximately in said second direction, is moved approximately in said first direction and engages and actuates a respective said second push switch.

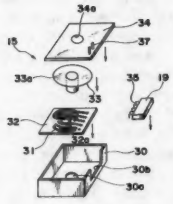
4,877,926

ACTUATOR OF AN AIR CONDITIONER OF A VEHICLE

Tokuhiro Yamase, Kosai, Japan, assignor to Asmo Co., Ltd., Kosai, Japan

Filed Oct. 4, 1988, Ser. No. 252,936
Claims priority, application Japan, Oct. 30, 1987, 62-167703
Int. Cl.[4] H01H *19/00, 3/32*
U.S. Cl. 200—19 R 1 Claim





1. An actuator of an air conditioner for use in a vehicle comprising:

a motor having a shaft extending therefrom and a worm gear fixed to the shaft;

a reduction gear unit including a helical gear which engages said worm gear and another gear that supports an output shaft, said helical gear and said gear that supports the output shaft being mounted at fixed positions on a gear unit housing, said reduction unit also including a plurality of spur gears which are mounted on the gear unit housing between said helical gear and said gear that supports the output shaft in order to transmit rotational movement of the motor to the output shaft through an appropriate reduction gear ratio;

a position-detecting unit including an output shaft-inserting cylinder having brushes mounted thereon and being removably fixed to said output shaft and being mounted at a predetermined position of a position-detecting unit housing, a printed circuit board mounted at a position on the position-detecting unit housing so that the brushes located on said output shaft-inserting cylinder contact switching patterns on the printed circuit board, and a connector which is connected to the printed circuit board for supplying power; and

an actuator housing for accommodating said motor and said gear, said reduction gear unit, and said position-detecting unit at predetermined positions;

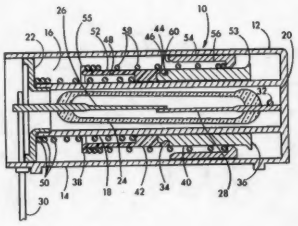
whereby said position-detecting unit including a certain switching pattern and the reduction gear unit having a certain reduction gear ratio can be held together in the actuator housing.

4,877,927

EXTENDED DWELL SHOCK SENSING DEVICE

Daniel R. Reneau, Madison, Wis., assignor to Hamlin Incorporated, Lake Mills, Wis.

Filed Apr. 6, 1989, Ser. No. 334,311
Int. Cl.[4] H01H *35/14*
U.S. Cl. 200—61.45 M 34 Claims



1. A shock sensor having an extended activation time comprising:

(a) a housing;

(b) a carriage slidably mounted on the housing for travel and including a magnet portion;

(c) a non-magnetic mass slidable on the carriage between a first site and a second site on the carriage;

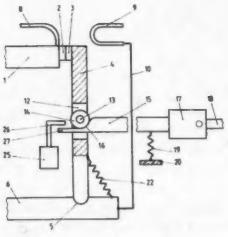
(d) a reed switch mounted on the housing to be responsive to the position of the magnet such that the reed switch is activated when the magnet travels to a pre-selected activation position during movement of the carriage in response to an initial acceleration force applied to the housing, and the reed switch will remain activated as the non-magnetic mass moves from the first site to the second site in response to an increased acceleration force, then the non-magnetic mass is moved back toward the first site upon cessation of the increased acceleration force, and until the carriage is moved back past the pre-selected activation position.

4,877,928

RELEASE MECHANISM FOR A HIGH SPEED CIRCUIT BREAKER

Henri Duffour, Douvaine, France; Serge Martin, Meyrin, and Ernst Studer, Genf, both of Switzerland, assignors to BBC Brown Boveri Ltd., Baden, Switzerland

Filed Jul. 21, 1988, Ser. No. 222,639
Claims priority, application Switzerland, Jul. 22, 1987, 2776/87
Int. Cl.[4] H01H *33/02*
U.S. Cl. 200—144 R 4 Claims



1. A release mechanism for a high speed circuit breaker, comprising:

a mobile contact bridge;

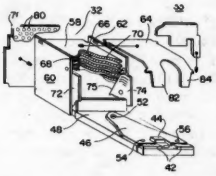
an axle in the mobile contract bridge;
a roller supported rotatably on the axle in the mobile contact bridge;
a rotatably supported jack acting in the circuit closing direction on the roller;
the frontal side of the jack facing the roller being in the form of a slide adapted at least in part to the contour of said roller;
means for exerting a force acting on the contact bridge in the disconnecting direction; and
a trigger acting on the jack;
said slide having a configuration such that in the circuit closing state of the contact bridge, the frictional forces acting on the roller are compensated.

4,877,929

BREAKING DEVICE FOR MULTIPOLE ELECTRICAL CIRCUIT BREAKER WITH MULTIPLE CONTACTS

Marc Rival, Virieu Sur Bourbre, France, assignor to Merlin Gerin, France

Filed Aug. 17, 1988, Ser. No. 233,032
Claims priority, application France, Aug. 31, 1987, 87 12117
Int. Cl.[4] H01H *33/12*
U.S. Cl. 200—146 R **5 Claims**



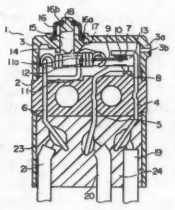
1. A breaking device for a multipole electrical circuit breaker with a molded insulating case, housing an operating mechanism coupled to a switching bar to provide closing and opening of all the circuit breaker poles, each pole comprising :
a pair of fixed current-conducting terminals, bearing on the base of the case,
an arc extinguishing chamber disposed above the first terminal, and comprising a stacking of metal arc deionization plates, each plate having a V-shaped notch,
a multiple contact system having a plurality of identical movable main contacts, divided into two sets of the same number on either side of a movable arcing contact extending longitudinally according to the center line of the pole, said contacts being pivotally mounted on an axis of a support tunnel securedly united to the bar, and cooperating with corresponding stationary contacts fixed on the internal end of the first terminal, the length of the movable arcing contact being greater than that of each movable main contact,
a pair of lower and upper arcing horns surrounding the stacking of arc extinguishing chamber plates, the lower arcing horn being securedly united to the upper face of the first terminal with an insulating shield interposed,
a pair of arc guiding jaws arranged in the arc extinguishing chamber, each jaw, made of gas-producing insulating material, having an inclined portion following the outline of the plates up to the vicinity of an intermediate arc catching ridge,
the lower arcing horn being fixed to the first terminal by means of three screws or rivets disposed at the peaks of an isoceles triangle, the first of the screws being situated along the center line of the pole in the vicinity of an edge of the insulating shield penetrating into a rear gap arranged between the plates and an outlet wall of the breaking gases to the outside.

4,877,930

SEALED PUSH-BUTTON SWITCH AND METHOD OF ASSEMBLY

Yasumichi Fukuma, Hirata, Japan, assignor to Omron Tateisi Electronics Co., Kyoto, Japan

Filed Jul. 28, 1988, Ser. No. 225,129
Claims priority, application Japan, Aug. 14, 1987, 62-124670[U]
Int. Cl.[4] H01H *35/02*
U.S. Cl. 200—302.2 **10 Claims**



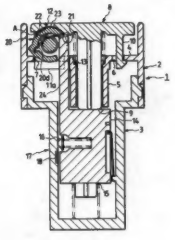
1. A sealed push-button switch, comprising:
a case, comprising a base and a cover attached to said base so as to form a space between the cover and the base;
a switching mechanism located in said space, said switching mechanism having a terminal which extends through the base so that one end of said terminal is located outside the case;
a frame attached to the case for housing said one end of said terminal;
a resin material injected into said frame and set for fixing said one end of said terminal; and
an air passage formed through said case so as to communicate with said space, for allowing air in the space to leak therethrough; and
sealing means for sealing said air passage after said resin material is injected into said frame.

4,877,931

SWITCH HAVING A VISABLE INDICATOR

Toshihiro Kawase, Aichi, and Sachiya Sano, Gifu, both of Japan, assignors to Kabushiki Kaisha Tokai Rika Denki Seisakusho, Aichi, Japan

Filed Aug. 5, 1988, Ser. No. 228,653
Claims priority, application Japan, Aug. 12, 1987, 62-123579[U]
Int. Cl.[4] H01H *9/16*
U.S. Cl. 200—308 **2 Claims**



1. A switch comprising:
a depressable button having an opening;
a contact holder moved from a turned-off position to a turned-on position or from the turned-on position to the turned-off position in response to the depression of said

button and retained in said turned-on or turned-off position until a subsequent depression of said button;

an indicator having a turned-on state indicating portion and a turned-off state indicating portion on the outside surface of said indicator and being rotatable to position in the opening of said button either said turned-on state indicating portion or said turned-off state indicating portion such that said positioned indicating portion of said indicator is visible through said opening of said button, said indicator including a rotatable member and said turned-on state indicating portion including a first surface portion of said member signifying said turned-on state of the switch and said turned-off state indicating portion including a second surface portion of said member signifying said turned-off state of the switch;

a spring for rotating said rotatable member to position said turned-on state indicating portion or said turned-off state indicating portion in said opening of said button; and

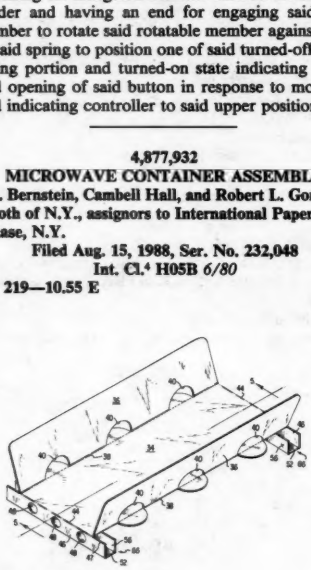
an indication controller movable between an upper position and a lower position in response to the depression of said button and engaging said indicator for rotating said indicator in response to the depression of said button to rotate said indicator to position one of said turned-off state indicating portion and said turned-on state indicating portion in the opening of said button in reponse to movement of said indication controller to said upper position and to position the other of said turned-off state indicating portion and said turned-on state indicating portion into the opening in response to movement of said indication controller to said lower position, said indication controller including an elongated member formed on said contact holder and having an end for engaging said rotatable member to rotate said rotatable member against the force of said spring to position one of said turned-off state indicating portion and turned-on state indicating portion in said opening of said button in response to movement of said indicating controller to said upper position.

4,877,932

MICROWAVE CONTAINER ASSEMBLY

Linda A. Bernstein, Cambell Hall, and Robert L. Gordon, Monroe, both of N.Y., assignors to International Paper Company, Purchase, N.Y.

Filed Aug. 15, 1988, Ser. No. 232,048
Int. Cl.[4] H05B *6/80*
U.S. Cl. 219—10.55 E **7 Claims**



1. A container assembly for the packaging of frozen foodstuffs which are to be cooked and browned in a microwave oven, the assembly including an outer carton formed of dielectric material and including a top panel, bottom panel, opposite sidewalls, and opposite end walls, said top panel including means to facilitate its manual removal from the remaining portions of the outer carton, a tray in the carton, the tray being formed from dielectric sheet material, such as paperboard, the tray including a bottom wall having upwardly sloping, opposite sidewalls, said sidewalls having upper, longitudinally extending edges, the tray bottom wall being parallel to and spaced from the outer carton bottom panel, the tray having a supporting foot at each opposite end thereof extending downwardly relative to said bottom wall of the tray and contacting the bottom wall of the tray, each foot being substantially hollow and elongated and being in the form of a tube where it contacts the tray bottom, having a surface thereof resting on said bottom panel of the outer carton, the ends of each said elongated foot abutting a respective opposite side wall of the outer carton to thereby inhibit relative movement between the tray and the outer carton, at least a portion of the tray bottom wall and tray sidewall surfaces carrying a microwave interactive material, the upper, food contacting surfaces of the tray bottom and sidewalls coated with a polymer.

4,877,933

METHOD AND APPARATUS FOR CONTROLLING DISTRIBUTION AND POWER WITHIN THE CELLS OF A DEVICE FOR PROMOTING THE UNIFORM HEATING OF A FOOD PRODUCT IN A RADIANT ENERGY FIELD

Roger A. Yangas, 14000 Citation Dr., Orland Park, Ill. 60642

Continuation-in-part of Ser. No. 19,216, Feb. 26, 1987, Pat. No. 4,771,155, which is a continuation-in-part of Ser. No. 765,374, Aug. 14, 1985, Pat. No. 4,683,362. This application Jan. 15, 1988, Ser. No. 144,520
The portion of the term of this patent subsequent to Sep. 13, 2005, has been disclaimed.
Int. Cl.[4] H05B *6/74*
U.S. Cl. 219—10.55 M **37 Claims**

1. An improved of controlling the distribution of power within an apparatus for promoting the uniform heating of a food product in a microwave radiant energy field, comprising:

providing an apparatus having a plurality of radiant energy collector cells formed solely by a plurality of tabs mounted to a plate; and

controlling the angle of said tabs relative to said plate of at least one of said collector cells to control the degree of heating of the food product located adjacent said collector cell.

4,877,934

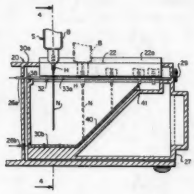
HYPODERMIC SYRINGE NEEDLE DESTROYING AND STERLIZING APPARATUS AND METHOD

Robert P. Spinello, 523 Post Ave., Westbury, N.Y. 11590, assignor to Robert P. Spinello, Westbury, N.Y.

Filed Dec. 18, 1988, Ser. No. 286,321
Int. Cl.[4] B23K *11/22*; B26F *3/06*
U.S. Cl. 219—68 **19 Claims**

17. A method for destroying and sterilizing used hypodermic needles comprising the steps of causing an electrical current to flow through substantially the full length of the needle shaft from hub to tip in an amount sufficient to heat the needle shaft to incandescence and partial destruction, and thereafter

progressively passing current through what remains of the needle shaft from the hub outward until substantially the entire



needle shaft is reduced to sterilized bits to a point adjacent the hub.

4,877,935

WIRE CUT ELECTRODISCHARGE MACHINE TOOL

Toshiyuki Aso, Hino, and Tamotsu Ishibashi, Hachioji, both of Japan, assignors to Fanuc Ltd., Yamanashi, Japan

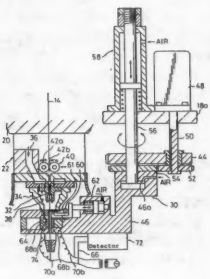
PCT No. PCT/JP87/00643, § 371 Date Jun. 30, 1988, § 102(e) Date Jun. 30, 1988, PCT Pub. No. WO88/01550, PCT Pub. Date Mar. 10, 1988

PCT Filed Aug. 31, 1987, Ser. No. 196,198

Claims priority, application Japan, Aug. 30, 1986, 61-202740

Int. Cl.[4] B23P *1/08*

U.S. Cl. 219—69.12 **3 Claims**



1. A wire cut electrodischarge machine tool having a work table for mounting a workpiece for automatic feed in X and Y plane directions, an electrode feeding device for feeding electrode wire through an electrodischarge machining region in which said workpiece is mounted, upper and lower heads above and below said work table, respectively, said heads each having a built-in wire guide, an automatic electrode wire feeding mechanism for automatically feeding electrode wire fed from said electrode feeding device between said upper and lower heads, said wire feeding mechanism including jet flowing machining fluid for automatic preparing for the start of machining, said wire cut electrodischarging machine tool being characterized by an electrode wire feeding mechanism for drawing back a disconnected end of the electrode wire disconnected in said electrodischarge machining region during the electrodischarge machining and for holding the disconnected end of said disconnected electrode wire for feed out, a wire end detecting means for detecting a disconnected end of said electrode wire outside of said electrodischarge machining region, a moving means for moving said electrode wire disconnected end to a predetermined electrode wire repair position positioned from said electrodischarge machining region according to detection of a disconnected end of said electrode wire by said wire end detecting means and for returning said disconnected end from said repair position to said electrodischarge machining region, a cutter means for cutting and repairing said electrode wire disconnected end at said electrode repair position, and a wire supporting plate for preventing the wire end after said cutting from following said cutter when said cutter is retracted.

4,877,936

SOLDERED STRUCTURE OF FINE WIRE, AND METHOD OF AND APPARATUS FOR SOLDERING FINE WIRE

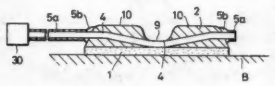
Jyunichi Kobayashi, Sakkura, Japan, assignor to Hitachi, Ltd., Tokyo, Japan

Filed Oct. 16, 1987, Ser. No. 109,166

Claims priority, application Japan, Oct. 17, 1986, 61-245201

Int. Cl.[4] B23K *1/00*

U.S. Cl. 219—85.22 **18 Claims**



14. A method of soldering a fine wire onto a conductor pattern, comprising:

disposing a solder layer on said conductor pattern;

disposing a fine wire with insulating coating on a surface of said solder layer in the longitudinal direction of said conductor pattern;

disposing a resistor tip above said fine wire in such a manner that said resistor tip is applied to said solder layer perpendicularly to the longitudinal direction of said conductor pattern;

abutting said resistor tip on said fine wire in the longitudinal direction thereof;

applying a pressure to said resistor tip and heating said resistor tip so as to press said fine wire towards said conductor pattern for melting said insulating coating so as to form an exposed joint portion and for forming burying portions to bury a part of said fine wire in said solder layer;

removing said resistor tip from said exposed joint portion where said fine wire is exposed out of said solder layer.

4,877,937

PLASMA SPRAY TORCH

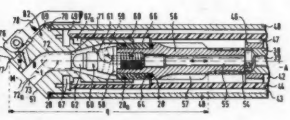
Niklaus Müller, St. -Sulpice, Switzerland, assignor to Castolin S.A., Lausanne, Switzerland

Filed Dec. 8, 1987, Ser. No. 129,986

Claims priority, application Fed. Rep. of Germany, Nov. 12, 1986, 3642375

Int. Cl.[4] B23C *9/00*

U.S. Cl. 219—121.59 **34 Claims**



1. A plasma spray coating torch for internally coating hollow members comprising: a spray nozzle which forms an electrode and which is connected anodically, said spray nozzle including a spray nozzle duct having a mouth region; a second electrode associated with the spray nozzle which is electrically insulated relative to the spray nozzle, said second electrode including a duct which passes through the second electrode; a torch arm receiving said second electrode having a central

tube, a rear portion and a longitudinal axis (A) and having separate and distinct flow ducts for a working gas and for a cooling agent, said cooling agent flowing from the rear of the torch arm in the direction of the spray nozzle in a first one of the flow ducts for forming a jacket of cooling agent disposed around the central tube, and which after the cooling operation has taken place being discharged from a second one of said flow ducts; a feed duct for a coating powder opening into the spray nozzle duct; the flow duct for said working gas joining the duct which passes through the second electrode; and at least in the mouth region the nozzle duct is inclined at an angle (t) relative to the longitudinal axis (A).

4,877,938

PLASMA ACTIVATED DEPOSITION OF AN INSULATING MATERIAL ON THE INTERIOR OF A TUBE

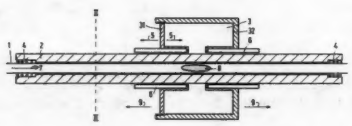
Hans Rau, Aachen, Fed. Rep. of Germany, and Petrus F. De Jongh, Veldhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Sep. 24, 1987, Ser. No. 100,391

Claims priority, application Fed. Rep. of Germany, Sep. 26, 1986, 3632684

Int. Cl.[4] B23K *9/00*

U.S. Cl. 219—121.59 **4 Claims**



4. An apparatus as in claim 2 where the tubular body is dimensioned to surround substantially the entire length of the tube.

4,877,939

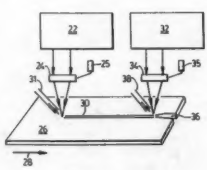
MEANS OF ENHANCING LASER PROCESSING EFFICIENCY OF METALS

Walter W. Duley, P.O. Box 453, King City, Ontario, Canada L0G 1K0, and Grant Kinsman, York University, 4700 Keele Street, Downsview, Ontario, Canada (M3J 1P3)

Division of Ser. No. 8,656, Jan. 30, 1987. This application May 12, 1988, Ser. No. 192,920

Int. Cl.[4] B23K *26/00*

U.S. Cl. 219—121.76 **2 Claims**



1. Apparatus for processing a material by laser radiation comprising a first laser having a beam of radiation of a first wavelength directed to impinge upon a surface of said material, means to cause relative movement between said material and said beam to cause said beam to travel along a track and a second laser having a beam of radiation of a second wavelength directed to impinge upon said material in advance of and spaced from said beam of said first laser and reduce the reflectivity thereof to radiation of said first wavelength.

4,877,940

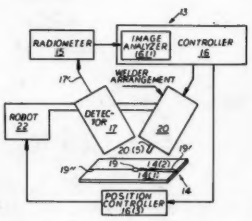
USING INFRARED IMAGING TO MONITOR AND CONTROL WELDING

Edmund R. Bangs, Indian Head Park; Nicholas E. Longinow, Oak Park, and James R. Blaha, Palos Heights, all of Ill., assignors to IIT Research Institute, Chicago, Ill.

Filed Jun. 30, 1987, Ser. No. 68,620

Int. Cl.[4] B23K *9/12*

U.S. Cl. 219—124.34 **105 Claims**



1. A real time welding process for welding adjacent materials with a weld puddle formed between the materials, said method comprising the steps of bringing a welding apparatus and consumable and the materials together to form a weld puddle at the interface of the adjacent materials, producing relative motion between the welding apparatus and the materials thereby defining a front edge of the weld puddle, thermographically scanning the weld puddle and its adjacent heat affected zone from the front and producing image signals representative of a thermographic image of the weld, analyzing said puddle image signals to extract therefrom data indicative of irregularities in the welding procedure, and adjusting the welding procedure to reduce said irregularities.

4,877,941

POWER SUPPLY SYSTEM FOR CONSUMABLE ELECTRODE ARC WELDING AND METHOD OF CONTROLLING THE SAME

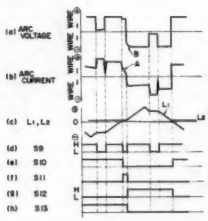
Masahiro Honma, Kamakura; Maruyama Tokuji, Yokohama; Masashi Okada, Fujisawa, and Yukio Hida, Kamakura, all of Japan, assignors to Kabushiki Kaisha Kobe Seiko Sho, Kobe, Japan

Filed May 11, 1988, Ser. No. 192,622

Claims priority, application Japan, May 12, 1987, 62-113551; Nov. 18, 1987, 62-289445; Nov. 18, 1987, 62-289446; Feb. 23, 1988, 63-38542

Int. Cl.[4] B23K *9/10*

U.S. Cl. 219—130.21 **3 Claims**



1. A power supply system for consumable electrode arc welding in which a DC welding voltage is applied alternately in the straight polarity and in the reverse polarity across a base metal and a consumable electrode being fed toward the base metal, said power supply system comprising:

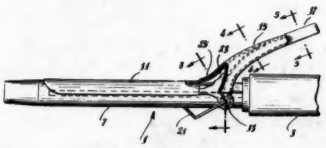
(a) a DC source for generating a DC voltage to be applied across the base metal and the consumable electrode;
(b) a reactor connected to the output of the DC source;
(c) an inverter circuit connected through the reactor to the DC source and comprising a plurality of switching elements for changing over the polarity of the DC voltage applied across the base metal and the consumable electrode, and first directional conductive elements respectively connected in parallel to the switching elements;
(d) an energy absorbing circuit including a series connection of a second directional conductive element and a capacitor, connected in parallel to the input of said inverter circuit; and
(e) a power supply circuit for applying a DC voltage to the capacitor.

4,877,942

THERMALLY-INSULATED CURLING IRON

John J. Raab, Brielle, N.J., assignor to Conair Corporation, Stamford, Conn.

Filed Jul. 19, 1988, Ser. No. 221,207
Int. Cl.[4] H05B *1/02*; A45D *1/04*
U.S. Cl. 219—225 **2 Claims**



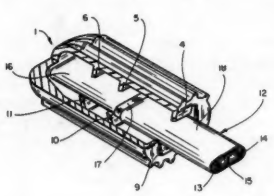
2. In a thermally-insulated curling iron, said curling iron having a handle, a barrel secured to said handle, means for heating said barrel, and a spoon pivotally mounted on said barrel and spring-pressed towards said barrel, and a spoon extension extending upwardly and outwardly from said barrel and said handle, that improvement including
the outer surface of said spoon extension being covered with thermally-insulating material, and the surface of said spoon extension facing said handle not being covered by said thermally-insulating material.
whereby, though heat is conducted from said barrel to said spoon extension, said heated spoon extension is thermally-insulated from contact with one using said curling iron, and heat can be dissipated from said spoon extension by radiation in a direction away from the user.

4,877,943

SEALING DEVICE FOR ELONGATE HEATER

Thomas Y. Oiwa, San Mateo, Calif., assignor to Raychem Corporation, Menlo Park, Calif.

Filed Dec. 8, 1988, Ser. No. 282,250
Int. Cl.[4] H02G *15/02*
U.S. Cl. 219—538 **18 Claims**



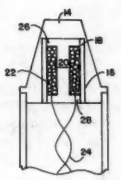
15. An assembly comprising an apparatus and an end of an elongate electrical heater, said heater comprising (a) first and second elongate electrodes, (b) a plurality of resistive heating elements connected in parallel between said electrodes, (c) an insulating jacket surrounding said electrodes and heating elements, and (d) a metallic grounding braid surrounding said insulating jacket, said apparatus comprising a housing of generally tubular shape which comprises
(1) a first open end and a second closed end;
(2) a longitudinal top portion with an interior surface and an exterior surface and a longitudinal bottom portion with an interior surface and an exterior surface;
(3) a plurality of first gripping members which are associated with the top portion and protrude from the interior surface thereof; and
(4) A plurality of second gripping members which are associated with the bottom portion and protrude from the interior surface thereof,
the insulating jacket being directly contacted with at least one first gripping member and at least one second gripping member and the metallic grounding braid (a) being contacted directly or through an outer insulating jacket which surrounds the braid by at least one first gripping member and at least one second gripping member and (b) being pushed back from the end of the heater.

4,877,944

SELF REGULATING HEATER

Mark J. Cowell, San Carlos; Kevin Ladd, and Philip S. Carter, Jr., both of Palo Alto, all of Calif., assignors to Metcal, Inc., Menlo Park, Calif.

Filed Jun. 8, 1987, Ser. No. 59,787
Int. Cl.[4] H05B *3/10*
U.S. Cl. 219—548 **6 Claims**



1. A heater comprising:
a conductive member,
a ferromagnetic material lining a surface of said conductive member,
a magnetic core of a material having a higher electrical resistivity and Curie temperature than said ferromagnetic material and located internally of said ferromagnetic material,
a coil wound on said core,
said core being located and shaped to tightly couple flux in said core to said ferromagnetic material, and
means adapted to connect said coil to a constant, alternating current source of sufficient amplitude to heat said ferromagnetic material to a temperature approaching its Curie temperature.

4,877,945

IC CARD HAVING A FUNCTION TO EXCLUDE ERRONEOUS RECORDING

Kunio Fujisaki, Aichi, Japan, assignor to Hitachi, Ltd., Tokyo, Japan

Filed Nov. 9, 1987, Ser. No. 118,603
Claims priority, application Japan, Nov. 10, 1986, 61-265484
Int. Cl.[4] G06F *15/30*
U.S. Cl. 235—379 **7 Claims**

1. An IC card used in an IC card system for performing transactions with the IC card having therein a microprocessor and memories in which said IC card is fed with power from an

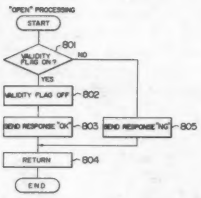
external device and a processing of transaction data is effected in accordance with instructions coming from the external device, comprising:

communication means for enabling the external device and the IC card to communicate with each other;

informing means for informing said IC card of instructions regarding the start and the end of the processing from the external device through said communication means;

generating means for generating information on the validity of transaction data based on instructions regarding the start and the end of the processing from the external device;

a non-volatile memory connected to said recording means, said communication means and said informing means for storing the information generated in said recording means; and



means for communicating said information on the validity of the transaction data recorded in said non-volatile memory to said external device at the start of the next processing, wherein said non-volatile memory is a rewritable memory and includes a flag table storing a flag indicating the validity of the data held in said memory on the basis of a signal representing the start and the end of the processing applied from said external device, and wherein said microprocessor receives a signal of said start, it refers to said flag table, and said memory includes means, which, if the flag in said table indicates the state of validity, rewrites said flag to the state of invalidity and transmits a response for allowing for said external device to start the processing operation and if it receives a signal at the end, stores a program to rewrite said flag to the state of validity.

4,877,946

CARD ISSUANCE APPARATUS WITH CANCELLATION MODE

Makoto Ando; Koichiro Kakinuma, both of Tokyo; Masahiko Sawa, Kanagawa; Hideaki Ohmuro, Chiba, and Akira Ohryo, Tokyo, all of Japan, assignors to Sony Corporation, Tokyo, Japan

Filed Apr. 16, 1986, Ser. No. 852,659

Claims priority, application Japan, Apr. 20, 1985, 60-85218

Int. Cl.[4] G06F *15/30*; G06K *5/00*

U.S. Cl. 235—380 **8 Claims**

1. Apparatus for issuing a card comprising:

(a) input means for taking in data necessary for issuing said card, said data including at least an identification of the issuing apparatus;

(b) memory means for storing said data;

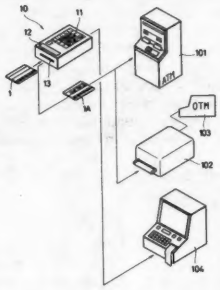
(c) recording means for recording said data in machine readable form, on a portion of said card when said card is issued;

(d) reading means for reading said data from said card;

(e) said input means including a cancellation key;

(f) means responsive to operation of said cancellation key and to recognition of the identification of the issuing apparatus for cancelling said data stored in said memory and recording on said card a message that recorded data has been cancelled;

(g) comparison means for comparing said data recorded on said card with said data stored in said memory means and inhibiting means for inhibiting cancellation in response to a noncomparison of predetermined constant data with



data read from said card, said inhibiting means being responsive to data which identifies that a transaction involving the card has been completed.

4,877,947

TRANSACTION PROCESSING SYSTEM

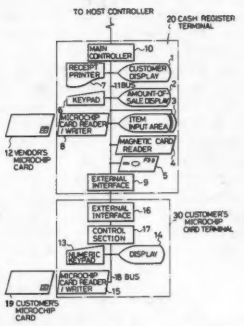
Toru Mori, Tokyo, Japan, assignor to Oki Electric Industry Co., Ltd., Tokyo, Japan

Filed Jul. 30, 1987, Ser. No. 79,454

Claims priority, application Japan, Aug. 5, 1986, 61-182730

Int. Cl.[4] G06F *15/21*

U.S. Cl. 235—381 **5 Claims**



1. A transaction processing system using a prepaid microchip card, comprising

a customer's microchip card in which a balance is recorded,

a vendor's microchip card in which a balance is recorded,

a terminal means for exchanging data between said customer's microchip card and said vendor's microchip card, for inputting the amount of a transaction, for instructing the customer's microchip card to perform the deduction, and for instructing the vendor's microchip card to perform the addition, said terminal means including a first terminal having a vendor's microchip card reader/writer disposed therein for communicating with said vendor's microchip card, and a second terminal which is electrically coupled to said first terminal for exchange of data therebetween, said second terminal having a customer's microchip card reader/writer disposed therein for communicating with said customer's microchip card,

said customer's microchip card having a function of authentication of said second terminal, and

said vendor's microchip card having a function of authentication of said first terminal,

wherein a transaction is processed by deducting the amount of the transaction from the balance in the customer's microchip card and adding said amount to the balance in the vendor's microchip card, and

said transaction processing is performed after the authentication by the customer's microchip card and the vendor's microchip card.

4,877,948

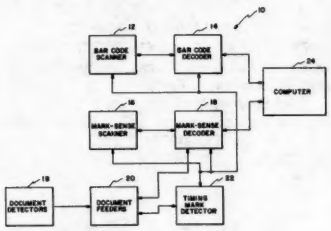
COMBINATION BAR CODE AND MARK-SENSE READER

Loren L. Krueger, 4834 Merilee Dr., Minnetonka, Minn. 55343

Filed Jun. 25, 1987, Ser. No. 66,163

Int. Cl.[4] G06K *7/08*

U.S. Cl. 235—449 **8 Claims**



1. A combination reader comprising:

bar code scanning means for scanning bar coded information on a document;

mark-sense scanning means for scanning mark-sense data on said document;

bar code decoding means, connected to said bar code scanning means, for decoding signals from said bar code scanning means;

mark-sense decoding means, connected to said mark-sense scanning means, for decoding signals from said mark-sense scanning means; and

timing means, for timing said bar code and mark-sense scanning means with movement of said document relative to said scanning means, comprising:

timing mark detecting means, connected to said bar code scanning means, to said mark-sense scanning means, to said bar code decoding means, and to said mark-sense decoding means, for detecting timing marks on said document;

document feeding means, connected to said mark-sense decoding means and to said timing mark detecting means, for moving said document through fields of view of said bar code scanning means and said mark-sense scanning means; and

document detecting means, connected to said document feeding means, for detecting the presence of said document.

4,877,949

HAND-HELD INSTANT BAR CODE READER SYSTEM WITH AUTOMATED FOCUS BASED ON DISTANCE MEASUREMENTS

Arvin D. Danielson, and Dennis A. Durbin, both of Cedar Rapids, Iowa, assignors to Norand Corporation, Cedar Rapids, Iowa

Filed Aug. 8, 1986, Ser. No. 894,689

Int. Cl.[4] G06K *7/10*

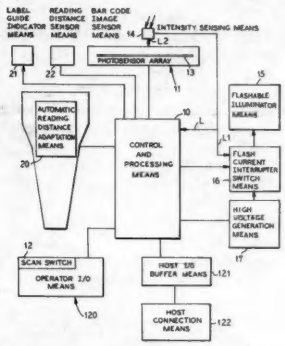
U.S. Cl. 235—462 **24 Claims**

1. In a bar code reader system, a hand-held bar code reader positionable by hand at varying distances from a bar code to be read and operable for reading bar codes at distances from said reader within a certain operative range, said reader comprising:

bar code sensor means for generating an output signal in accordance with a bar code image incident thereon,

distance measurement means for automated reading of distances of a bar code from the hand-held bar code reader over a certain measurement range which exceeds said certain operative range for reading of bar codes,

reading distance adaption means for automatically adapting the reader to the reading of a bar code at varying distances therefrom within the said operative range by causing an image of the bar code to be substantially focused at the image sensor means,



enabling means for enabling a bar code reading operation, and

control means coupled with said enabling means and said distance measuring means and operative in response to enabling of a bar code reading operation by said enabling means and in response to reading by said distance measurement means of distances within said operative range for automatically controlling the reading distance adaptation means during movement of the reader relative to a bar code within said operative range to tend to establish and maintain a focused bar code image at the image sensor means.

4,877,950

ELECTRONIC PURSE-DEVICE

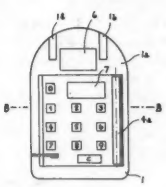
John W. Halpern, Potomac, Md., assignor to Paperless Accounting, Inc., Washington, D.C.

Filed Aug. 23, 1982, Ser. No. 410,246

The portion of the term of this patent subsequent to Oct. 31, 2003, has been disclaimed.

Int. Cl.[4] G06K *19/00*

U.S. Cl. 235—487 **10 Claims**



1. For use with an electronic fund transfer device having an outer wall portion with a reactive transfer element for enabling transfer of data between said transfer device and an associated device; a terminal having a frame, receptable means coupled to

said frame for reciprocable motion between a ready position and an operate position, said receptacle having a forward wall portion accessible by the outer wall portion of the transfer device, said forward wall portion including a reactive transfer element reactively engageable with the transfer device reactive transfer element when the outer wall portion and said forward wall portion are arranged in mutual contact, means for biasing said receptacle means to said ready position, and means for enabling data transfer via said reactive elements when said receptacle means is moved towards said operate position.

4,877,951

PHOTOSENSITIVE POSITION SENSOR

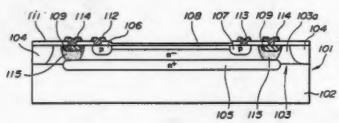
Hideo Muro, Yokohama, Japan, assignor to Nissan Motor Company, Limited, Yokohama, Japan

Division of Ser. No. 90,603, Aug. 28, 1987, Pat. No. 4,841,138. This application Apr. 14, 1989, Ser. No. 338,059

Claims priority, application Japan, Aug. 28, 1986, 61-200200; Aug. 28, 1986, 61-200201

Int. Cl.[4] H01J *40/14*

U.S. Cl. 250—211 J **4 Claims**



1. A photosensitive position sensing semiconductor device comprising;

a substrate of a first conductivity type,

an overlying layer of a second conductivity type formed on said substrate,

a highly doped buried layer of said second conductivity type selectively formed between said substrate and said overlying layer,

a top layer of said first conductivity type formed in a surface of said overlying layer to form a photosensitive pn junction with said overlying layer,

first and second electrodes, connected, respectively, to first and second separate positions of said top layer, for taking photocurrents,

a highly doped second conductivity type semiconductor region surrounding said top layer, and

a third electrode connected with said highly doped second conductivity type region.

4,877,952

FASER CAVITY OPTICAL MEMORY WITH OPTICAL STORAGE AND READOUT

Thirumala R. Halemane, Howell, and Steven K. Korotky, Toms River, both of N.J., assignors to American Telephone and Telegraph Company, New York, N.Y. and AT&T Bell Laboratories, Murray Hill, N.J.

Filed Oct. 11, 1988, Ser. No. 255,292

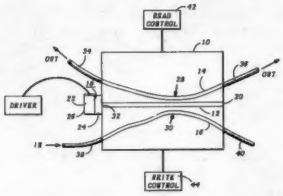
Int. Cl.[4] H01J *31/50*

U.S. Cl. 250—213 A **9 Claims**

1. An optical device comprising

a laser having a cavity capable of assuming a first state or a second state to act as a memory for data that is to be stored,

writing means coupled to selectively optically trigger said laser to the first or second state with the data that is to be stored, and



reading means coupled to selectively transfer the state of the laser to a waveguide.

4,877,953

CURRENT-VOLTAGE CONVERTER CIRCUIT

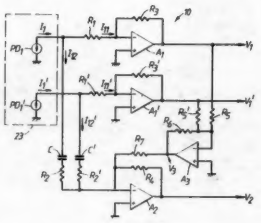
Mikio Yamamuro, Kanagawa, Japan, assignor to Kabushiki Kaisha Toshiba, Kanagawa, Japan

Filed Sep. 15, 1988, Ser. No. 245,174

Claims priority, application Japan, Sep. 30, 1987, 62-246008

Int. Cl.[4] H01J *40/14*

U.S. Cl. 250—214 R **14 Claims**



1. A current-voltage converter circuit comprising:

means for outputting a current having a low-pass signal component and a high-pass signal component;

band split means for splitting the current output from the current outputting means into the low-pass signal component and the high-pass signal component;

first conversion means for converting the low-pass signal component split off by the band split means into a first output signal having a first prescribed voltage; and

second conversion means for converting the output signal from the first conversion means and the high-pass signal component split off by the band split means into a second output signal having a second prescribed voltage.

4,877,954

LIGHT COUNTING SYSTEM FOR CONVEX ARTICLES

Arnold I. Neuman, 6 Circle Dr., Mt. Kisco, N.Y. 10549; Thomas D. Heidt, Long Valley, N.J.; Andrew Bergman, Mountain Lakes, N.J., and James Wickstead, Mendham, N.J., assignors to Arnold I. Neuman, Mountain Lake, N.J.

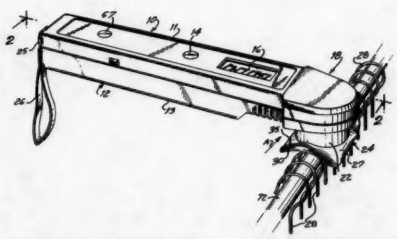
Filed Sep. 22, 1986, Ser. No. 909,994

Int. Cl.[4] H01J *40/14*

U.S. Cl. 250—222.2 **37 Claims**

1. An apparatus for counting hangers having a convex surface comprising: a housing; a central light source means carried by said housing for projecting a light beam on the convex surface; a pair of spaced light detection means positioned on said housing substantially on opposed sides of said central light source means for detecting light reflected from the convex

surface; and detecting circuit means coupled to the central light detection means for detecting a sequence of reflected light beams characteristic of the relative displacement of the



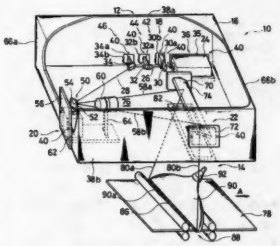
housing and the convex surface in substantially the direction of the space between said pair of opposed light detection means and the direction of the curvature of the convex surface.

4,877,955

OPTICAL UNIT WITH DETACHABLY-MOUNTED OPTICS TO MAINTAIN HERMETIC SEALING OF THE UNIT

Shuji Ono, Kanagawa, Japan, assignor to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Apr. 20, 1988, Ser. No. 183,805
Claims priority, application Japan, Apr. 20, 1987, 62-96833
Int. Cl.[4] H01V *5/02*
U.S. Cl. 250—239 **4 Claims**



1. An optical unit for use in a light beam scanning apparatus, said optical unit comprising a housing and an optical element accommodated in an interior of said housing, said optical element being detachably mounted in said housing from an outside of said housing such that hermeticity is maintained in said interior of said housing.

4,877,956

CLOSED FEEDBACK INJECTION SYSTEM FOR RADIOACTIVE MATERIALS USING A HIGH PRESSURE RADIOACTIVE SLURRY INJECTOR

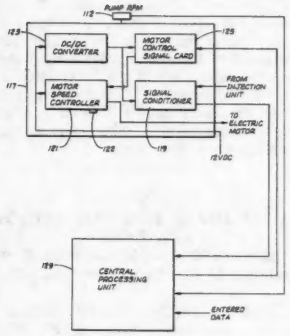
Mark A. Priest, Duncan, Okla., assignor to Halliburton Company, Duncan, Okla.

Filed Jun. 23, 1988, Ser. No. 210,257
Int. Cl.[4] G01V *5/00*
U.S. Cl. 250—259 **20 Claims**

1. A slurry injection system, comprising:

injection means for injecting a volume of the slurry at a predetermined rate, and for providing a feedback signal based upon said volume of slurry which has been injected;

local power means for providing a driving force to said injection means; and



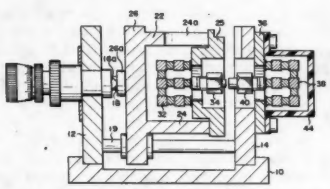
control means for controlling an injection rate of said volume of slurry.

4,877,957

SCANNING TYPE TUNNEL MICROSCOPE

Takao Okada; Toshihito Kouchi; Shuzo Mishima; Haruo Ogawa, all of Tokyo; Seizo Morita, and Nobuo Mikoshiba, both of Sendai, all of Japan, assignors to Olympus Optical Co., Ltd., Tokyo, Japan

Filed Jul. 7, 1987, Ser. No. 70,775
Claims priority, application Japan, Jul. 14, 1986, 61-165032; Jul. 14, 1986, 61-165033; Jul. 14, 1986, 61-165034
Int. Cl.[4] H01J *37/26*
U.S. Cl. 250—306 **19 Claims**



1. A scanning-type tunnel microscope, comprising:

a substrate (110);

a support (112) extending from the substrate;

a sample holding member (120) for supporting a sample (118);

a scanning probe (134) which extends in an axial direction toward, and faces, said sample (118), to be separated therefrom by a predetermined distance;

means for applying a voltage between the sample and scanning probe to flow a tunnel current therebetween;

a scanning probe holding member (132) for supporting said scanning probe (134); and

a first actuator (116) coupled to said sample holding member (120) and a second actuator (122) coupled to said scanning probe holding member (132), said first and second actuators relatively driving said sample and scanning probe in the axial direction and a plane direction through said sample holding member and said scanning probe holding member;

one (122) of said actuators including first, second and third elongated members (124, 126, 128) which are extensible in their longitudinal directions when signals are received, all said elongated members extending at predetermined an-

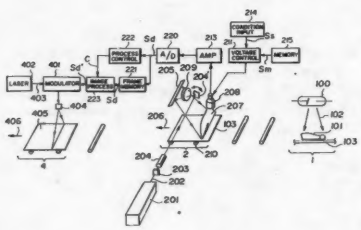
gles with respect to one another and being joined at first ends of each, said first and second elongated members (124,126) being fixed on the substrate (110) at their other ends, said third elongated member (128) extending and spaced from the substrate and fixed to the support (112), said joined ends of the elongated members (124, 126, 128) supporting one of the sample and scanning probe holding members, and said sample and scanning probe positioned between the substrate and third elongated member, the substrate (110), support (112), third elongated member (128), and first and second elongated members (124,126) defining a closed frame in which said sample (118) and scanning probe are positioned.

4,877,958

RADIATION IMAGE READ-OUT METHOD AND APPARATUS

Toshitaka Agano, and Nobuyoshi Nakajima, both of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Dec. 29, 1987, Ser. No. 138,753
Claims priority, application Japan, Dec. 29, 1986, 61-310250
Int. Cl.[4] G01N *23/04*
U.S. Cl. 250—327.2 **4 Claims**



1. A radiation image read-out method for exposing a stimulable phosphor sheet carrying a radiation image stored thereon to stimulating rays which cause the stimulable phosphor sheet to emit light in proportion to the stored radiation energy, and photoelectrically detecting the emitted light by use of a light detection means to obtain image signals for use in reproduction of a visible image,

wherein the improvement comprises the steps of:

(i) storing light detection ranges of said light detection means suitable for image recording conditions in conformity with the respective image recording conditions in a storage means, and

(ii) in the course of detection of said light emitted by said stimulable phosphor sheet, designating the image recording conditions with respect to said stimulable phosphor sheet on which image read-out is to be carried out, reading the light detection range corresponding to the designated image recording conditions from said storage means, and setting said light detection range read from said storage means in said light detection means even though preliminary read-out is not carried out.

4,877,959

SPACE PHOTON SOURCE LOCATOR

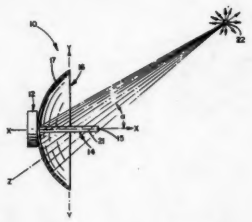
George H. Page, La Mirada, Calif., assignor to Rockwell International Corporation, El Segundo, Calif.

Filed Sep. 21, 1987, Ser. No. 98,642
Int. Cl.[4] G01J *1/20*
U.S. Cl. 250—336.1 **16 Claims**

1. An apparatus, comprising:

means for detecting radiation emanating from a source of radiation;

means positioned with respect to said means for detecting for blocking at least a portion of said means for detecting when said means for detecting is not oriented in the direction of a source of radiation; and



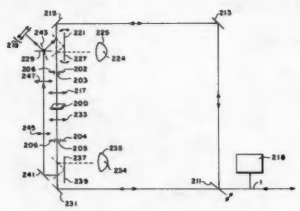
means coupled to said means for detecting and responsive to blocked radiation for orienting said means for detecting in the direction of a source of radiation.

4,877,960

MICROSCOPE HAVING DUAL REMOTE IMAGE MASKING

Robert G. Messerschmidt, and Donald W. Sting, both of Stamford, Conn., assignors to Spectra-Tech, Inc., Stamford, Conn.

Continuation of Ser. No. 15,315, Feb. 17, 1987, abandoned. This application Jan. 4, 1989, Ser. No. 293,549
Int. Cl.[4] G01J *3/08*; G01N *21/00, 21/59, 21/47*
U.S. Cl. 250—341 **8 Claims**



1. A microscope for spectrometry to analyze samples comprising:

radiant energy source means to provide an invisible radiant energy beam;

a first light source means to provide a visible light beam;

a sample plane containing a sample to be analyzed;

means to direct either the invisible radiant energy beam in a sampling mode or the visible light beam in a viewing mode along a common optical path, such path spatially passing through the sample;

a first remote sample image plane on the common optical path;

a first mask located at the first remote sample image plane in the common optical path remote from the sample such that said invisible radiant energy beam passes through said first mask before impinging upon the sample;

a first lens on the common optical path between said first mask and said sample plane to form an image of said sample at the remote sample image plane and an image of the mask at the sample plane;

a viewing means located such that said first mask and said remote sample image plane are viewable from the invisible radiant energy source side of the sample;

means to vary the size of the first mask during viewing in the viewing mode to spatially define the sample area to a selected targeted arbitrary shape;

an invisible radiant energy detector operative in the sampling mode to detect invisible radiant energy passing from

said radiant energy source through the first mask, as adjusted, and the first lens to the targeted arbitrary shape of the sample to provide analysis of the sample within the selected targeted arbitrarily shaped area;

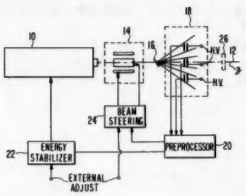
and a movable optical switching means to direct either invisible radiant energy from the sample to the detector in the sampling mode or visible light to the viewing means in the viewing mode.

4,877,961

IN-LINE ELECTRON BEAM ENERGY MONITOR AND CONTROL

Raymond D. McIntyre, Los Altos Hills, and Stanley W. Johnsen, Palo Alto, both of Calif., assignors to Varian Associates, Inc., Palo Alto, Calif.

Filed Oct. 26, 1988, Ser. No. 263,084
Int. Cl.[4] H01J 49/44
U.S. Cl. 250—397 7 Claims



1. An accelerator energy detector and stabilization system operative on an unanalyzed beam of charged particles comprising:

(a) accelerator means for producing a beam flux of charged particles of nominal energy E_0, said accelerator having at least one operating parameter for varying said nominal energy E_0, said beam flux defining a beam axis,

(b) scattering means interposed on said beam axis for interacting with a fraction of said beam whereby said fraction of beam flux is deflected from a path substantially along said axis through a broad angular range with respect to said axis,

(c) first scattered flux detector means disposed proximate said beam axis and displaced with respect to said axis subsequent to said scattering means for generating a first scattered flux signal indicative of the scattered fraction of the beam intercepted thereby, said disposition and displacement defining a nominal scattering angle θ_1 whereby said scattered flux signal is representative of flux scattered through an angle θ_1 with respect to said axis,

(d) second scattered flux detector means disposed proximate said beam axis and displaced with respect to said axis subsequent to said scattering means for generating a second scattered flux signal indicative of the scattered fraction of the beam intercepted thereby, said disposition and displacement defining a nominal scattering angle θ_2 whereby said scattered flux signal is representative of flux scattered through an angle θ_2 with respect to said axis,

(e) differential comparator means for processing said θ_1 and θ_2 signals and producing therefrom an energy difference signal proportional to a function of said θ_1 and θ_2 signals and said nominal energy E_0,

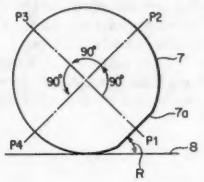
(f) energy correction means for accepting said energy difference signal and for adjusting said operating parameter of said accelerator means.

4,877,962

ION IMPLANTATION METHOD

Saburou Ohsaki; Taketo Takahashi, and Toshihiro Miki, all of Itami, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Japan

Filed Apr. 29, 1988, Ser. No. 188,485
Claims priority, application Japan, Apr. 30, 1987, 62-109328
Int. Cl.[4] G21K 5/10
U.S. Cl. 250—442.1 3 Claims



1. An ion implantation method comprising:

positioning a generally planar silicon substrate having a (100) orientation in a first position in which said substrate is tilted with respect to an incident ion beam and said substrate is rotated in its own plane by an angle of 15° to 75° to a first position from a position in which the (110) crystal planes of said substrate are aligned with said ion beam;

irradiating said substrate in said first position with the ion beam with a dose of ions equal to approximately ¼ of the total desired dose of ions to be implanted into said substrate;

rotating said substrate in its plane to a second position which is 90° removed from the first position and irradiating said substrate with said ion beam with a dose of ions equal to approximately ¼ of the total desired dose of ions;

rotating said substrate in its plane to a third position which is 180° removed from the first position and irradiating said substrate with said ion beam with a dose of ions equal to approximately ¼ of the total desired dose of ions; and

rotating said substrate in its plane to a fourth position which is 270° removed from the first position and irradiating said substrate with said ion beam with a dose of ions equal to approximately ¼ of the total desired dose of ions.

4,877,963

CONTAINER FOR STORING AND STERILIZING A KITCHEN-USE CHOPPING BOARD

Liaw Min-Jenn, 9 Floor, No. 1291, Cherng-Der Rd., Taipei, Taiwan

Filed Jun. 16, 1988, Ser. No. 207,237
Int. Cl.[4] A61L 3/00
U.S. Cl. 250—455.1 3 Claims

1. A container, in which a kitchen-use chopping board is stored and sterilized, comprising:

a fixed casing body, which is integrally formed by a horizontal long circumferential wall, a longitudinal long circumferential wall, two longitudinal short circumferential walls, a horizontal short circumferential wall and a bottom part;

a movable casing body, which is integrally formed by a horizontal long circumferential wall and two longitudinal long circumferential walls and is locked to one lateral side of the fixed casing body;

a pair of fixing plates on which a lamp tube for sterilization and a lamp tube for heating purposes are rigidly fixed and, each lamp tube is separately fixed to an interior layer of the fixed casing body and the movable casing body;

a pair of net covers, which is set at an exterior lateral side of the fixing plates and are also jointly fixed with the fixing plates into the interior layer of the fixed casing body and

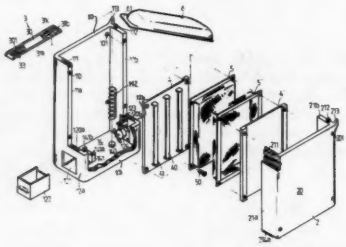
the movable casing body, so as to protect the forementioned lamp tube and heating tube from being damaged;

a micro-switch, which is set at the interior layer proximate an interior lateral side of the longitudinal short circumferential wall;

a water collection case, which is set at an aperture which is preset at the lower direction proximate an exterior lateral side of the longitudinal short circumferential wall and is removed at will;

a compression spring, the lower end of which is rigidly fixed to a convex stud which is preset at the bottom part of the fixed casing body and, the upper end of which is rigidly fixed to a convex stud which is preset at the lower direction of the plate plane of a holding plate;

a fixing seat of the holding plate, which is rigidly fixed at the bottom part of the casing body and on which a joining groove hole is set which is connected with the holding plate;



the holding plate on which a plurality of convex studs are scattered, having joining pins set at two lateral sides of its front edge to coordinate with joining groove holes set on a fixed seat of the holding plate and, each convex stud is preset at the reversed side of the plate plane being rigidly fixed with the upper end of the compression spring;

a cover body, which is housed to the top plane of the fixed casing body and the movable casing body and is closed or opened at will;

a circulation fan mounted in the fixed casing body;

the elements of the forementioned assembly cooperating such that the holding plate will be caused to descend under the weight of the chopping board when it is being put inside the casing body and placed on it to get in touch with the micro-switch to further activate the functioning of the circulation fan and the sterilization lamp tube and the heating lamp tube to sterilize and store the chopping board.

4,877,964

ULTRAVIOLET STERILIZING APPARATUS

Yoshio Tanaka, and Shirou Saitou, both of Tokyo, Japan, assignors to Kureha Chemical Industry Co., Ltd., Tokyo, Japan

Filed Jul. 19, 1988, Ser. No. 221,229

Claims priority, application Japan, Aug. 5, 1987, 62-119282[U]; Dec. 15, 1987, 62-189377[U]

Int. Cl.[4] A61L *2/10*

U.S. Cl. 250—455.1 **5 Claims**

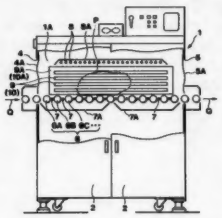
1. An ultraviolet sterilizing apparatus comprising:

a sterilization chamber defining an enclosed space and having an entrance and an exit;

a roller conveyor including a number of rollers arranged between the entrance and the exit for conveying products to be sterilized through the interior of said sterilization chamber along a conveyance path;

a plurality of first sterilizing ultraviolet lamps arranged about the conveyance path; and

a plurality of second sterilizing ultraviolet lamps situated below the conveyance path, each of said second ultraviolet lamps being interposed between mutually adjacent



ones of said rollers and arranged at a level lower than that of a conveyance plane of said roller conveyor.

4,877,965

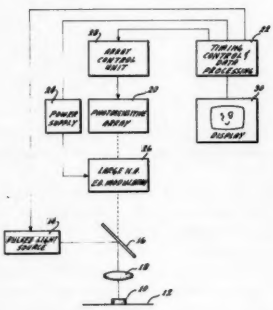
FLUOROMETER

Walter B. Dandliker, La Jolla; Howard S. Barr, Carlsbad; Henry S. Katzenstein, Pacific Palisades, and Keith R. Watson, Alpine, all of Calif., assignors to Diatron Corporation, San Diego, Calif.

Filed Jul. 1, 1985, Ser. No. 751,746

Int. Cl.[4] G01N *21/64*

U.S. Cl. 250—458.1 **123 Claims**



1. A fluorometer for measuring a particular fluorescence emanating from particular fluorophore molecules in a specimen, including,

means for producing a burst of concentrated light energy having a pulse time short compared to the decay time of the particular fluorescence and having sufficient energy to excite substantially all of the particular fluorophore molecules,

means responsive to the burst of concentrated light energy for directing the burst of concentrated light energy toward the specimen to produce a fluorescence from the specimen including the particular fluorescence,

means responsive to the fluorescence from the specimen for detecting the fluorescence and for producing signals in accordance with such detection,

means coupled to the detecting means for controlling the detecting means within a particular time period to optimize the detection of the particular fluorescence and to enhance the detection of the particular fluorescence relative to the total fluorescence, the beginning of the particular time period being defined by a first particular time after the burst of concentrated light energy and during the production of the particular fluorescence and the end of the particular time period being defined by a second particular time after the first particular time where the second

particular time occurs during the production of the particular fluorescence from the specimen as a result of the burst of the concentrated light energy,

means coupled to the burst producing means, to the detecting means and to the controlling means for timing the operation of the above means to sequence the detection of the fluorescence during the particular time period as a result of the production of the burst of concentrated light energy,

means coupled to the detection means for forming signals representative of the particular fluorescence from the specimen, and

means responsive to the detection of the particular fluorescence from the specimen during the particular time period for producing an image of the particular fluorescence.

4,877,966

METHOD AND APPARATUS FOR THE MEASUREMENT OF LOW-LEVEL LASER-INDUCED FLUORESCENCE

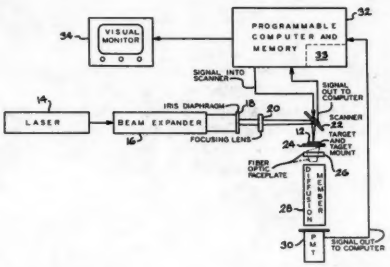
L. David Tomei, Dublin; Fred Cornhill, Worthington; Jogikal Jagadeesh, and Michael Boninger, both of Columbus, all of Ohio, assignors to Ohio State University Research Foundation, Columbus, Ohio

Division of Ser. No. 828,694, Feb. 12, 1986. This application Jan. 29, 1988, Ser. No. 150,293

The portion of the term of this patent subsequent to Jul. 19, 2005, has been disclaimed.

Int. Cl.[4] G01J *3/10*

U.S. Cl. 250—458.1 **26 Claims**



1. An improved method for measuring the excited fluorescence of an object comprising:

binding a specific dye to such object;

securing such object in a fixed position;

generating a coherent beam of light;

scanning such fixed object with said coherent beam of light in a preprogrammed three dimensional pattern and at a preselected rate to induce such fluorescence;

gathering such fluorescent light with an optical fiber member, such optical fiber member attenuating said coherent beam of light used to induce such fluorescence;

measuring the intensity of said fluorescent light in a light intensity measuring device; and

sequentially recording data regarding the intensity of said fluorescent light as a function of the location of said scanning beam of light on said object.

4,877,967

PACKAGE INSPECTING APPARATUS

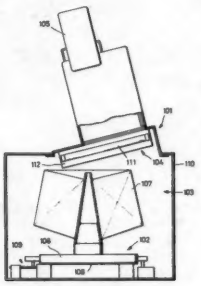
Shuzo Kawamura, Joyo, Japan, assignor to Murata Kikai Kabushiki Kaisha, Kyoto, Japan

Filed May 28, 1987, Ser. No. 55,715

Claims priority, application Japan, Jun. 3, 1986, 61-128413; Jun. 6, 1986, 61-86404[U]; Jun. 10, 1986, 61-89159[U]; Jun. 13, 1986, 61-90103[U]

Int. Cl.[4] G01N *21/64*

U.S. Cl. 250—461.1 **2 Claims**



1. A package inspecting apparatus, comprising a package inspecting station, a dark room including a light interrupting member for covering said package inspecting station, an ultraviolet ray generator located within said dark room for irradiating an ultraviolet ray upon a surface of a package within said dark room, and a light receiver located in a contiguous relationship to said dark room for receiving fluorescent light emitted from the package which receives and absorbs an ultraviolet ray from said ultraviolet ray generator.

4,877,968

THIN LAYER EL PANEL

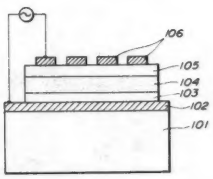
Kazunori Miwa, Yokohama, Japan, assignor to Nissan Motor Co., Ltd., Yokohama, Japan

Filed Dec. 8, 1987, Ser. No. 130,191

Claims priority, application Japan, Dec. 9, 1986, 61-291522

Int. Cl.[4] H01J *1/62*

U.S. Cl. 250—484.1 **11 Claims**



1. An electroluminescent panel comprising:

a substrate;

a transparent electrode disposed on said substrate;

a first dielectric layer disposed on said transparent electrode, said first dielectric layer being comprised of one of silicon yttrium oxynitride and silicon yttrium aluminum oxynitride;

a fluorescent layer;

a second dielectric layer disposed on said fluorescent layer, said second dielectric layer being comprised of one of silicon yttrium oxynitride and silicon yttrium aluminum oxynitride; and

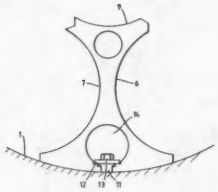
rear surface electrodes disposed on said second dielectric layer.

4,877,969

FLASKS FOR RADIOACTIVE MATERIALS

Leslie G. James, Sandiway, and Michael J. Old, Antrobus, both of United Kingdom, assignors to British Nuclear Fuels Plc, Warrington, England

Filed Mar. 15, 1988, Ser. No. 168,234
Claims priority, application United Kingdom, Apr. 6, 1987, 8708198
Int. Cl.[4] G21F 5/00
U.S. Cl. 250—507.1 8 Claims



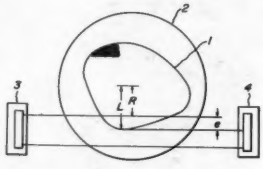
1. A flask for the transport of radioactive material comprising a hollow cylindrical body, a plurality of substantially identical individual elongate members releasably secured within the body to define longitudinally extending channels to receive and accommodate containers for radioactive material, each member having concave longitudinally extending side surfaces which each form only a portion of a channel, another portion of which is formed by a said side surface of an adjacent one of said members, and each member having a radially outer surface curved to conform to the curvature of the interior of the hollow cylindrical body whereby to maximize thermal contact therebetween for dissipation of heat generated by decay of the radioactive material.

4,877,970

PROCESS FOR MEASURING CONTOUR CONFIGURATIONS OF ARTICLES DEFINED BY NUMEROUS CYLINDRICAL SURFACE PORTIONS

Masayasu Minamikawa; Yoshiaki Onabe, and Masanao Ono, all of Nagoya, Japan, assignors to NGK Insulators, Ltd., Nagoya, Japan

Filed Sep. 13, 1988, Ser. No. 243,998
Claims priority, application Japan, Sep. 17, 1987, 62-233574
Int. Cl.[4] G01N 21/86
U.S. Cl. 250—560 2 Claims



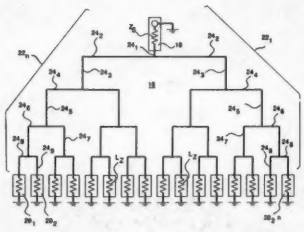
1. A process for measuring the contour configuration of an article defined by numerous cylindrical surface portions, which process comprises placing the article on a turntable, irradiating parallel light beams upon one side portion of the article while rotating the turntable, detecting changes, as a function $L(\theta)$ by means of a light-receiving member, in locations L at which the parallel light beams are interrupted by the articles, said θ denoting a rotational angle of the turntable, inputting data of $L(\theta)$ thus detected into a memory of a computer, calculating a value of $L(\theta)+L(\theta+180°)$, comparing the thus calculated value with that for an ideal contour configuration, and correcting deviations in a position and an angle of the article, whereby a correct measured value is obtained.

4,877,971

METHOD AND APPARATUS FOR DISTRIBUTING A SIGNAL

Ching-Wen Hsue, Holland, Pa., assignor to American Telephone and Telegraph Company, New York, N.Y.

Filed Aug. 31, 1988, Ser. No. 238,787
Int. Cl.[4] H02J 1/00
U.S. Cl. 307—11 4 Claims



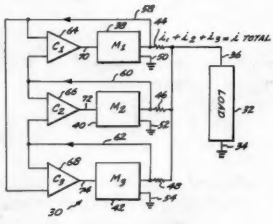
1. A network for distributing a signal from a single source to 2^n loads (where n is an integer ≥ 0), consisting of 2^n paths of approximately the same electrical length, each coupling a source to a separate one of the loads, the paths each consisting of $2n+1$ serially connected segments $L_1, L_2 \ldots L_{2n+1}$, respectively, with the segments $L_1, L_2 \ldots L_{2n-1}$ of each path being common to another of the paths, the segments $L_1, L_2 \ldots L_{2n+1}$ having corresponding impedances $Z_1, Z_2 \ldots Z_{2n+1}$, respectively, which are selected such that each load is substantially matched to the source and the internal signal reflections within the branch are minimized.

4,877,972

FAULT TOLERANT MODULAR POWER SUPPLY SYSTEM

Seyd M. Sobhani, and Raldon M. Smith, both of Renton, Wash., assignors to The Boeing Company, Seattle, Wash.

Filed Jun. 21, 1988, Ser. No. 209,506
Int. Cl.[4] H02M 3/335; H02J 1/00
U.S. Cl. 307—43 21 Claims



1. A fault tolerant modular power system comprising:
(a) a plurality of power supplies, each having an output connected in parallel to supply current to a load, and each having the same nominal output voltage;
(b) current monitoring means associated with each of the power supplies, for monitoring a condition indicative of

the magnitude of the current output by each, and operative to produce a signal corresponding to the magnitude of said current; and

(c) comparator means, connected to the current monitoring means and responsive to the signals said current monitoring means produce, for determining the difference between the current supplied by each power supply and at least one other power supply in the system that serves as a first order reference power supply, each power supply having a different first order reference power supply thereby producing a plurality of differential signals corresponding to said differences, each differential signal serving as a reference signal to control the output current of one of the power supplies causing the power supplies to have substantially equal output voltages and equal output currents.

4,877,973

APPARATUS FOR DEALING WITH CABLES IN INDUSTRIAL ROBOTS

Nobutoshi Torii, Hachioji; Hitoshi Mizuno, and Kyoji Iwasaki, both of Hino, all of Japan, assignors to Fanuc Ltd., Minamitsuru, Japan

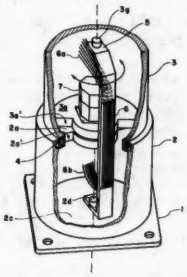
PCT No. PCT/JP87/00349, § 371 Date Oct. 5, 1987, § 102(e) Date Oct. 5, 1987, PCT Pub. No. WO87/07450, PCT Pub. Date Dec. 3, 1987

PCT Filed May 30, 1987, Ser. No. 117,195

Claims priority, application Japan, May 30, 1986, 61-124788

Int. Cl.[4] H01B *7/30*; H02G *11/00*; B25J *19/00*

U.S. Cl. 307—147 **9 Claims**



1. An apparatus for guiding a cable of an industrial robot having a hollow support casing and a hollow swivel casing rotatably supported by said support casing for undergoing swiveling motion, and equipped with a cable led into the interior of the swivel casing from the support casing, the apparatus comprising:

an upper wall provided on an upper portion of the support casing;

a first arcuate cut-out portion provided in said upper wall;

a lower wall provided on a lower portion of the swivel casing adjacent the upper wall provided on the upper portion of said support casing;

a second arcuate cut-out portion provided in said lower wall and at least partially overlapping the first arcuate portion provided in the upper wall of the support casing;

a cable guide having an upper arm, a lower arm, each having proximal and distal ends, and a back column portion joining the proximal ends of the upper and lower arms, the back column portion passing through said first and second arcuate portions and being rotatably supported inside said support casing and swivel casing at the distal ends of the upper and lower arms; and

a cable provided along the back column portion of the cable guide and being connected at one end to the support casing and at the opposite end to the swivel casing.

4,877,974

CLOCK GENERATOR WHICH GENERATES A NON-OVERLAP CLOCK HAVING FIXED PULSE WIDTH AND CHANGEABLE FREQUENCY

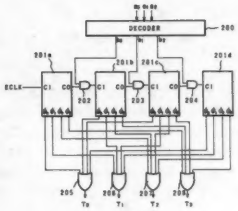
Hiroyuki Kawai, and Shinichi Nakagawa, both of Itami, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Japan

Filed May 3, 1988, Ser. No. 189,885

Claims priority, application Japan, Dec. 4, 1987, 62-308195

Int. Cl.[4] H03K *5/13, 7/00, 17/80, 5/00*

U.S. Cl. 307—269 **5 Claims**



1. An n-phase clock generating apparatus that receives an external input signal of a predetermined frequency comprising:

a plurality of n-phase clock generating circuit stages, n being a predetermined integer, each stage for generating a clock pulse of the first phase in synchronism with the front edge of an external input signal, and n-1 following clock pulses having a fixed phase relationship with said clock pulse of the first phase;

a plurality of gates serially connecting said clock generating circuit stages such that a previous clock generating circuit stage supplies a next clock generating circuit stage with a signal whose front edge is generated in synchronism with the rear edge of the last following clock pulse of the previous stage when the gate connecting the previous with the next is enabled;

a plurality of OR gates, each coupled to receive the same phase clock signal from the plurality of stages, each OR gate for outputting a logical sum signal of clock pulses of same phase clock signal received from said clock generating circuit stages; and

a circuit for outputting a switching signal coupled to said each gate to enable the gates connecting a first m sequential clock generating circuit stages such that the frequency of the generated clock pulses may be a multiple of the frequency of the external input signal.

4,877,975

LOGIC CIRCUIT HAVING AN OUTPUT SIGNAL WITH A GENTLE LEADING EDGE

Masaji Ueno, Yokohama, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Mar. 25, 1988, Ser. No. 173,668

Claims priority, application Japan, Mar. 27, 1987, 62-71874

Int. Cl.[4] H03K *17/16*

U.S. Cl. 307—443 **3 Claims**

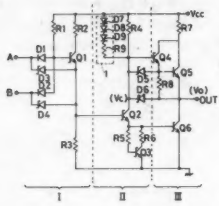
1. A logic circuit comprising:

(a) an input section for receiving at least one input signal and generating a logic result signal;

(b) a control section including at least one first switching element having a first constant resistance circuit connected between an output terminal of said first switching element and a supply voltage, said first switching element being turned on or off in response to the logic result signal from said input section to generate a control signal;

(c) an output section including at least two second and third

switching elements and an output terminal connected to a junction point between the two second and third switching elements, said second and third switching means being turned on or off alternatively in response to the control signal to generate a logic output signal; and



(d) means, coupled in parallel to the first constant resistance load circuit, for increasing the load resistance of said first switching element with increasing output terminal potential of said first switching element to obtain an output signal with a gentle leading edge at high response speed.

4,877,976

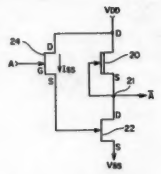
CASCADE FET LOGIC CIRCUITS

Lawrence E. Lach, Chicago, and Mikiharu Ohoka, Schaumburg, both of Ill., assignors to Gould Inc., Rolling Meadows, Ill. and Nippon Mining Co., Ltd., Japan

Continuation of Ser. No. 25,899, Mar. 13, 1987, abandoned. This application Oct. 13, 1988, Ser. No. 257,897

Int. Cl.[4] H03K *19/094*

U.S. Cl. 307—450 **25 Claims**



25. A logic circuit, comprising:

a first potential node;

a second potential node;

a first group III-V field effect transistor having a first gate, having a first source, and having a first drain, said first gate receiving an input signal;

a second group III-V field effect transistor having a second gate, having a second source, and having a second drain, said first drain and said second drain being coupled at said first node to receive said first potential, said second gate and said second source being coupled together; and

a third group III-V field effect transistor having a third source receiving said second potential, having a third drain coupled to said second source, and having a third gate coupled solely to said first source.

4,877,977

ECL CIRCUIT HAVING AN IMPROVED EMITTER FOLLOWER OUTPUT CIRCUIT

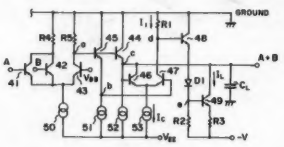
Masayuki Kokado, Machida, Japan, assignor to Fujitsu Limited, Kawasaki, Japan

Filed May 27, 1988, Ser. No. 199,637

Claims priority, application Japan, Jun. 2, 1987, 62-138443

Int. Cl.[4] H03K *19/086, 3/01*

U.S. Cl. 307—455 **12 Claims**



1. A semiconductor integrated circuit having an emitter follower circuit coupled with an output of a logic circuit, comprising:

a first emitter follower means for receiving an output signal of a logic circuit, an output signal obtained at an emitter output of the first emitter follower means forming a finalized output signal of the logic circuit;

second emitter follower means for receiving the output signal of the logic circuit, said first and second emitter follower means being supplied with the same output signal of the same phase derived from said logic circuit;

detecting means, connected to said first and second emitter follower means, for detecting a difference in level between the output signal of the first emitter follower means and an output signal of the second emitter follower means; and

driving means, connected to said detection means, for driving a load capacitance, coupled with the emitter output of the first emitter follower means, during a period when the detecting means detects the difference.

4,877,978

OUTPUT BUFFER TRI-STATE NOISE REDUCTION CIRCUIT

Paul E. Platt, Starkville, Miss., assignor to Cypress Semiconductor, San Jose, Calif.

Filed Sep. 19, 1988, Ser. No. 246,634

Int. Cl.[4] H03K *19/017, 19/096, 17/04, 17/687*

U.S. Cl. 307—473 **6 Claims**

1. An output buffer circuit capable of switching from the off state to the on state, and from the on state to the off state, without generating significant noise, comprising:

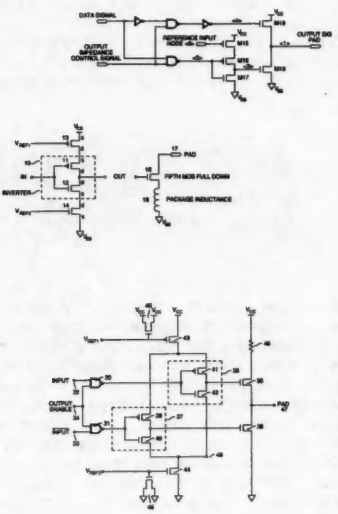
an MOS inverter circuit having a first node for connection to one terminal of a power supply and a second node for connection to the other power supply node, and having an input means for receiving an input signal and an output means for providing an output signal to an output transistor;

a first MOS transistor of one polarity type and of either enhancement or depletion mode, having its source-drain circuit coupled in series with said first node of said MOS inverter circuit;

a second MOS transistor of the opposite polarity type or mode from said first MOS transistor, having its source-drain circuit coupled in series with the said other node of said MOS inverter circuit;

a means for supplying a first reference voltage to the gate of said first MOS transistor and for supplying a second reference voltage which is the mirror of said first reference voltage to the gate of said second MOS transistor, said reference voltages enabling said first and second MOS transistors to act like constant current sources which

generate stable currents over normal variations in operating and processing conditions of the MOS transistors in the circuit, whereby the rise and fall times of said output signal from said inverter circuit are precisely controlled



irrespective of normal changes in operating or processing conditions of the MOS transistors in the circuit, thereby reducing the noise when said output transistor connected to said output means is turned on or off.

4,877,979

FILTER ARRANGEMENT

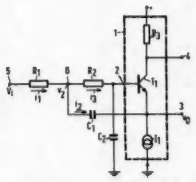
Adrianus Sempel, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Nov. 30, 1987, Ser. No. 126,380

Claims priority, application Netherlands, Dec. 11, 1986, 8603152

Int. Cl.[4] H03K *5/00*; H03F *1/36*

U.S. Cl. 307—520 **13 Claims**



1. A filter arrangement comprising at least a first and a second resistor connected in series between an input terminal for receiving an input signal and an input of an amplifier circuit comprising a transistor having a base coupled to the input and an emitter coupled to a first power-supply terminal by means of a current source and to a first output for providing a first output signal, means for coupling said first output to a junction point between the first resistor and the second resistor via a first capacitor, second means including a second capacitor for coupling the amplifier circuit input to a power-supply terminal, and third means coupling the collector of the transistor to a second output for providing a second output signal and to a second power supply terminal via a third resistor.

4,877,980

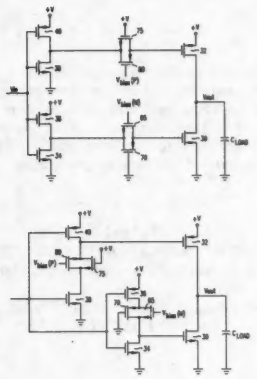
TIME VARIANT DRIVE CIRCUIT FOR HIGH SPEED BUS DRIVER TO LIMIT OSCILLATIONS OR RINGING ON A BUS

James J. Kubinec, Incline Village, Nev., assignor to Advanced Micro Devices, Inc., Sunnyvale, Calif.

Filed Mar. 10, 1988, Ser. No. 166,351

Int. Cl.[4] H03K *19/003, 17/16, 17/687, 17/284*

U.S. Cl. 307—542 **10 Claims**



1. A time variant drive circuit comprising:

an N-channel MOS driver transistor coupled to a first circuit, said driver transistor controlling voltage applied to said first circuit in response to a time variant drive signal;

a first field-effect transistor having a second terminal coupled to a gate of said driver transistor and having a channel with a width-to-length ratio such that a high digital drive signal applied to a first terminal of said first field-effect transistor produces a gradually increasing voltage at said second terminal of said first field-effect transistor, leveling off at a maximum drive signal voltage; and

a second field-effect transistor having a second terminal coupled to said gate of said driver transistor and having a channel with a width-to-length ratio such that said high digital drive signal applied to a first terminal of said second field-effect transistor rapidly produces a certain voltage at said second terminal of said second field-effect transistor, said certain voltage being lower than said maximum drive signal voltage so as not to cause objectionable ringing on a bus coupling said driver transistor to said first circuit.

4,877,981

PRECISION DEVICE FOR SOFT CLIPPING AC AND DC SIGNALS

Gary D. Gomes, Newark, Calif., assignor to Ampex Corporation, Redwood City, Calif.

Filed May 25, 1988, Ser. No. 198,420

Int. Cl.[4] H03K *5/08*

U.S. Cl. 307—555 **8 Claims**

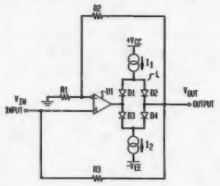
1. An apparatus for soft clipping AC and DC signals, comprising:

amplifier means having an inverting and non-inverting input, respectively, said non-inverting input receiving an input signal;

a diode switching circuit coupled to an output of said amplifier means for connecting an output signal of said amplifier

means to an output terminal of said apparatus when a magnitude of said output signal is below a threshold level, and for disconnecting said output signal from said output terminal when said magnitude is above said threshold level; and

purely resistive voltage divider means having a linear transfer function, for applying a portion of said input signal to said output terminal, said voltage divider means comprising a first feedback resistor coupled between said output terminal and said inverting input of said amplifier means, and a second feedback resistor coupled between said output terminal and said non-inverting input of said amplifier means.

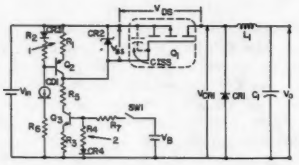


4,877,982

MOSFET TURN-ON/OFF CIRCUIT

Charles S. Walker, Seattle, Wash., assignor to Honeywell Inc., Minneapolis, Minn.

Filed Jan. 23, 1989, Ser. No. 299,508
Int. Cl.[4] H03K *17/687*
U.S. Cl. 307—571 **5 Claims**



1. A dual current source MOSFET turn-on/off circuit comprising:

a MOSFET connected between a voltage source and a load;

a turn-off current source comprising a first high gain bipolar transistor connected to a gate electrode of said MOSFET;

a turn-on current source comprising a second high gain bipolar transistor connected in series with said first bipolar transistor; and

switch means connected to a base electrode of said second bipolar transistor for turning said second bipolar transistor on and off, said turn-on current source overpowering said turn-off current source when said second bipolar transistor is turned on to charge a gate-to-source capacitance of said MOSFET and said turn-off current source discharging said gate-to-source capacitance of said MOSFET when said second bipolar transistor is turned off.

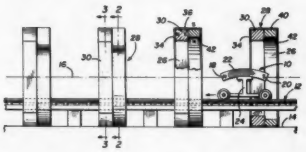
4,877,983

MAGNETIC FORCE GENERATING METHOD AND APPARATUS

Howard R. Johnson, Box 199, 314 N. Main, Blacksburg, Va. 24060

Filed Nov. 19, 1985, Ser. No. 799,618
Int. Cl.[4] H02K *41/00*
U.S. Cl. 310—12 **6 Claims**

1. In combination with a movable armature, means for guiding movement of the armature along a predetermined path and a permanent armature magnet having magnetic poles of opposite polarity spaced from each other along said path to establish a magnetic field of limited extent movable with the armature and magnetic stator means for establishing a stationary magnetic flux zone along said path, the improvement comprising flux emitting surfaces of one polarity mounted on the stator means on opposite sides of said path for limiting said flux zone through which said path extends and means mounting the permanent armature magnet on the armature with the poles thereof orientated relative to said flux emitting surfaces on the stator means for unidirectionally propelling the armature along said path through the limited zone in response to magnetic



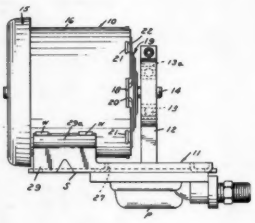
interaction between the movable magnetic field and the limited flux zone, said magnetic stator means including a plurality of magnetic gate assemblies fixedly spaced from each other along said path and respectively establishing stationary magnetic fields, each of said gate assemblies including a plurality of interconnected bar magnets substantially bordering said limited flux zone exposing pole faces of opposite polarity in parallel spaced planes intersected by said path, and magnetic means connected to said interconnected bar magnets exposing one of the flux emitting surfaces of said one polarity perpendicular to said parallel planes for magnetic interaction of the stationary magnetic fields.

4,877,984

ELECTRIC MOTOR AND PUMP MOUNTING BRACKET ASSEMBLY AND METHOD OF MAKING

Robert A. Colwell, and Thomas W. Stone, both of Owosso, Mich., assignors to MagneTek Universal Electric, Owosso, Mich.

Filed Jul. 19, 1988, Ser. No. 221,138
Int. Cl.[4] H02K *7/00*
U.S. Cl. 310—66 **10 Claims**



1. An electric motor pump mounting bracket assembly comprising

an electric motor comprising a stator, a rotor and a shaft on which the rotor is mounted,

a pump mounting bracket fastened to the motor for supporting a pump which is to be driven by the shaft of the electric motor,

said electric motor comprising

a cylindrical shell which encircles the stator of the motor and has a centerline,

said shell having at least one surface on the shell which is accurately positioned longitudinally of the shell,

a pair of end members having radial extending portions engaging said surface,

said end members rotatably supporting said shaft in concentric relation to said shell,

said pump mounting bracket including a mounting surface that is accurately located parallel to the centerline of the shell and forms the mounting surface for a pump,

said bracket further including an opening through which a connecting link may extend from a pump to the shaft of the motor,

said mounting surface on said shell being in predetermined longitudinally spaced relation to the opening in the bracket,

said bracket including a pair of upstanding portions welded to said shell and supporting said shell with its centerline in accurate relation to said mounting surface.

4,877,985

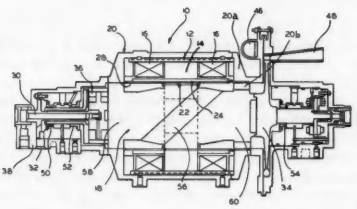
DYNAMOELECTRIC MACHINE

William A. Byrd, 1107 Brookfield, Rockford, Ill. 61107; Joel E. Oman, 4450 River La., Rockford, Ill. 61111, and William Connors, 6830 Millbrook Dr., Rockford, Ill. 61108

Filed Dec. 29, 1986, Ser. No. 946,719

Int. Cl.[4] H02K *5/10*

U.S. Cl. 310—86 **26 Claims**



1. A dynamoelectric machine, comprising:

a stator including a core having a winding applied thereto;

a rotor disposed inwardly of said stator in spaced relation to said core and said winding;

means for delivering a corrosive reactive fluid to a turbine; and

a composite shielding member disposed within said housing between said stator and said rotor, said composite shielding member being formed of a non-conductive non-magnetic material at least in the region defined by said core of said stator and extending beyond said core at both ends thereof at least into the region defined by said winding of said stator, said non-conductive non-magnetic material including a non-porous ceramic material facing said rotor to prevent said fluid from migrating therethrough;

said composite shielding member also being formed of a second material integral with said non-conductive ceramic material, said second material being adapted for securing said composite shielding member in a fixed position within said housing in a sealed manner to define a sealed rotor cavity capable of receiving said fluid therewithin, said core of said stator being isolated from said fluid in said rotor cavity by said composite shielding member.

4,877,986

ROTOR OF MAGNETIC GENERATOR

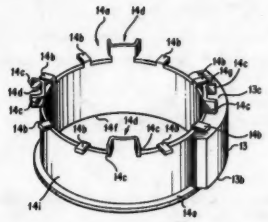
Yuzuru Shimizu, Himeji, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed May 19, 1988, Ser. No. 196,625

Claims priority, application Japan, May 19, 1988, 62-122020

Int. Cl.[4] H02K *21/22, 5/06*

U.S. Cl. 310—153 **6 Claims**



1. A rotor of a magnetic generator, comprising:

a bowl-shaped flywheel having a disc-shaped bottom part and a cylindrical peripheral wall part of a first inside diameter;

a plurality of magnets, disposed on an inner surface of said peripheral wall of said flywheel at intervals of a predetermined angle;

a magnet-holding cylinder having an inner cylindrical surface of a predetermined second diameter smaller than said first inside diameter having an outward flange formed on a first open end and a plurality of outward protrusions circularly formed on a second open end at intervals of another predetermined angle, said plurality of magnets being respectively positioned thereby to be parallel to the axis of said magnet-holding cylinder; and

a resin molded member, that fills in spaces formed between said flywheel, said magnets and said magnet-holding cylinder for making said flywheel, said magnets and said magnet-holding cylinder in one piece so as to leave an inside open space contiguous with said inner cylindrical surface.

4,877,987

MOTOR WITH AXIALLY DISPLACEABLE ROTOR

Heinz Flaig, Bochum; Udo Neumann, Dortmund; Heinz Hasselmann, Hagen; Karl Zacharias, Schwerte; Rainer Horbach, and Harald Bitsch, both of Witten, all of Fed. Rep. of Germany, assignors to Mannesmann AG, Duesseldorf, Fed. Rep. of Germany

Filed Dec. 23, 1986, Ser. No. 946,314

Claims priority, application Fed. Rep. of Germany, Dec. 24, 1985, 3546100; Aug. 4, 1986, 3626270; Aug. 18, 1986, 3627992; Nov. 3, 1986, 3637591

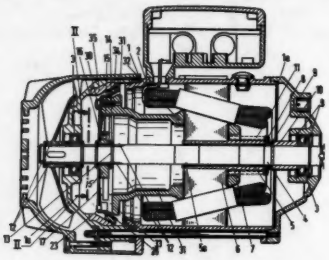
Int. Cl.[4] H02K *17/32*

U.S. Cl. 310—209 **24 Claims**

1. An electrical motor comprising stator and an axially displaceable spring-biased rotor for assuming a first axial position of running and a second axial position upon braking, there being a motor shaft mounted in bearings in a housing for the motor,

at least one deformable rotor mounting element having radial outer portion means fastened to at least one end of the rotor, said element having individual arm means with inward radially extensions for being relatively easily deformable in axial direction to permit axial displacement of the rotor relative to the shaft, said element being azimuthally and peripherally stiff and relatively undeformable in

peripheral direction for the transmission of torque from the rotor upon the shaft; and



carrying means for connecting the deformable rotor mounting element to the shaft.

4,877,988

PIEZOELECTRIC AND PYROELECTRIC POLYMERS

Vincent D. McGinniss, Dalaware, and Joseph R. Preston, Radnor, both of Ohio, assignors to Battelle Memorial Institute, Columbus, Ohio

Continuation of Ser. No. 353,747, Mar. 1, 1982, abandoned. This application May 22, 1985, Ser. No. 736,982

Int. Cl.[4] H01L *41/18;* H02N *7/00*

U.S. Cl. 310—306 11 Claims

1. A pyroelectric element comprising a polarized copolymer or homopolymer of trifluorovinyl acetate disposed between two electrodes.

4,877,989

ULTRASONIC POCKET ATOMIZER

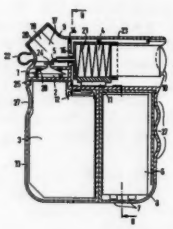
Wolf-Dietrich Drews, Lichtenfels; Klaus Van Der Linden, Kronach; Martin Rüttel, Grub a. Forst, and Jürgen Friedrich, Neuensorg, all of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Munich, Fed. Rep. of Germany

Continuation-in-part of Ser. No. 84,413, Aug. 10, 1987, abandoned. This application Jan. 12, 1989, Ser. No. 296,846

Claims priority, application Fed. Rep. of Germany, Aug. 11, 1986, 3627222

Int. Cl.[4] H01L *41/08*

U.S. Cl. 310—323 18 Claims



1. An ultrasonic pocket-size atomizer comprising:

a first housing;

vibration generation means mounted liquid-tight in said first housing for generating an oscillation with a frequency in the ultrasonic range said vibration generation means including a piezoelectric assembly and electronic circuit means operatively connected to said assembly for energizing said assembly and causing the piezoelectric assembly to vibrate;

power source means disposed in said first housing for supplying electric current to said electronic circuit means;

a second housing, removably mounted on said first housing;

a cartridge containing liquid to be atomized, said cartridge having at least one section movably disposed in said second housing; and

activation means for automatically activating said electronic circuit means upon motion of said section of said cartridge, said activation means including a magnet arranged and configured relative to said section of said cartridge so as to move therewith, said activation means further including a switch operatively connected to said electronic circuit means and operable by said magnet upon a shift in the position thereof during motion of said section of said cartridge.

4,877,990

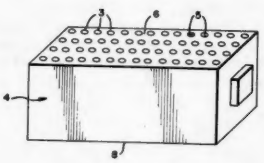
STERILIZATION SYSTEM BY MEANS OF HIGH THERMAL GRADIENT DUCTS

Alintor Florenzano, Jr., Rua Marechal Deodoro, No. 195/214,, Cep: 25600 - Petropolis - RJ, Brazil

Continuation-in-part of Ser. No. 683,520, Dec. 19, 1984. This application Mar. 25, 1987, Ser. No. 29,986

Int. Cl.[4] F24H *3/00;* H05B *1/00*

U.S. Cl. 219—381 5 Claims



1. An air sterilization apparatus comprising a refractory block having a top and a bottom, a plurality of vertically disposed ducts extending through said block from said bottom to said top, said ducts having a cross-sectional area of between 1.7–7.07 square millimeters and a length of between 4–12 centimeters, said ducts including top and bottom ends and said duct ends communicating directly with ambient air, an axially extending resistive heating filament disposed within each of said ducts, and means for supplying electrical energy to said heating filaments to produce a high thermal gradient in said ducts whereby ambient air is drawn into and upwardly through said ducts solely by convection with minimal increase in temperature of the ambient air due to air issuing from said ducts.

4,877,991

OPTICAL RADIATION SOURCE

Walter L. Colterjohn, Jr., 1201 Oak Ridge Cir., Barrington, Ill. 60010

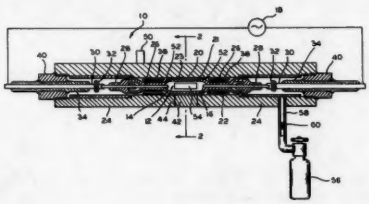
Filed Dec. 21, 1987, Ser. No. 135,348

Int. Cl.[4] H01J *61/34, 61/52*

U.S. Cl. 313—22 58 Claims

1. An optical radiation source including a light transmitting electrically insulating tube having an electrode at opposite ends of said tube, pressurized gas within said tube, means for sealing said electrodes to said tube whereby said pressurized gas is retained within said tube, connection means for connecting said electrodes to a suitable source of electrical power to thereby establish a gaseous arc within said tube, an enclosure means having wall means for exerting a compressive force upon said tube adequate to counteract a predetermined internal pressure within said tube that would be in excess of the maximum pressure which said tube could normally withstand, cooling means in contact with said enclosure means and adapted to remove heat transmitted to said enclosure means from said tube, at least one window means in said enclosure

means for transmitting light from said tube through said wall means, said enclosure wall means and said at least one window means providing means for facilitation of heat transfer from said tube, in which said enclosure wall means is fabricated from a material having the product of its tensile strength and thermal conductivity being substantially greater than the similar



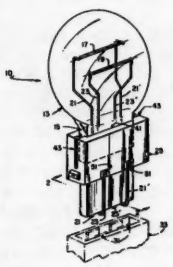
product of the material from which said tube is fabricated, whereby, for the retention of said predetermined pressure of said pressurized gas, the thermal impedance between the inside wall of said tube and said cooling medium is reduced, which reduced thermal impedance permits operation of said tube at a higher than normal power input and a higher than normal brightness.

4,877,992

ELECTRIC LAMP HAVING CONDUCTORS WITH MEANS FORMED THEREIN FOR REMOVING CONTACT SURFACE MATERIAL

Daniel D. Devir, S. Sutton, N.H., assignor to GTE Products Corporation, Danvers, Mass.

Filed Jul. 9, 1987, Ser. No. 71,235
Int. Cl.[4] H01J *5/48*
U.S. Cl. 313—318 **9 Claims**



1. An electric lamp for being removably positioned within a socket having electrical contacts therein, said lamp comprising:

an insulative base;

an envelope located within said base and having at least one filament therein;

a sealed end portion and a pair of conductors coupled to said filament and projecting exteriorly of said sealed end portion and passing through said base to extend therefrom in a predetermined alignment on said base, each of said conductors electrically connected to a respective one of said contacts within said socket when said lamp is positioned therein; and

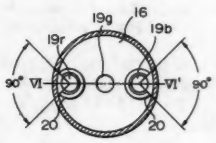
means for removing surface material from said contacts during insertion and removal of said lamp within said socket, said means comprising a roughened surface within at least a portion of each of said conductors which extends from said base, said means thereby improving electrical contact between said conductors and said contacts.

4,877,993

INLINE TYPE COLOR PICTURE TUBE HAVING COMA DISTORTION CORRECTING MECHANISM

Takaaki Ogasa, Mobara, Japan, assignor to Hitachi, Ltd., Tokyo, Japan

Filed Feb. 19, 1988, Ser. No. 157,793
Claims priority, application Japan, Mar. 20, 1987, 62-63786
Int. Cl.[4] H01J *29/51*
U.S. Cl. 313—414 **3 Claims**



1. A color picture tube including inline type electron guns and an electron beam electromagnetic deflecting apparatus, comprising:

a shield cup made of a nonmagnetic material which is attached to tips of said electron guns;

three electron beam through-holes formed in said shield cup and arranged in the incline direction; and

annular magnetic material members which are arranged around the two outside electron beam through-holes among said three electron beam through-holes so as to be coaxial with said through-holes and to pass said electron beams, each of said magnetic material members being made of a material of a high permeability and serving as a shield of leakage magnetic fields from said electromagnetic deflecting apparatus, each of said two outside magnetic material members having a gap portion on the side opposite to the central electron beam through-hole, both of said gap portions having symmetrical shapes around said central electron beam through-hole as a center, and

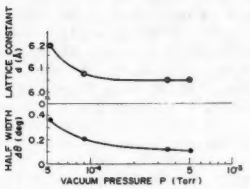
each of said gap portion of said annular magnetic material members having an opening angle of $90° \pm 10°$ in the radial direction from the center of said member.

4,877,994

ELECTROLUMINESCENT DEVICE AND PROCESS FOR PRODUCING THE SAME

Moriaki Fuyama; Katsumi Tamura; Kazuo Taguchi, Tokyo; Kenichi Onisawa, Hitachi; Akira Sato, Takahagi; Kenichi Hashimoto, Katsuta; Takahiro Nakayama, Hitachi, and Yoshio Abe, both of Hitachi, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Mar. 23, 1988, Ser. No. 172,415
Claims priority, application Japan, Mar. 25, 1987, 62-68880
Int. Cl.[4] H05B *33/22*
U.S. Cl. 313—503 **19 Claims**



1. An electroluminescent device which comprises:

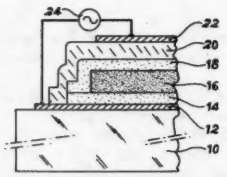
transparent electrodes formed on a transparent substrate;
a first insulating layer formed on the transparent electrodes;
an electroluminescent layer containing strontium sulfide as a matrix and having a lattice constant of not more than 6.07Å and a half-width at the (111) face of not more than 0.21 degree, formed on the first insulating layer;
a second insulating layer formed on the electroluminescent layer; and
back side electrodes formed on the second insulating layer.

4,877,995

ELECTROLUMINESCENT DISPLAY DEVICE USING HYDROGENATED AND CARBONATED AMORPHOUS SILICON

Pascal Thioulouse, Paris, and Ionel Solomon, Boulogne, both of France, assignors to Etat Francais Represente par le Ministre des PTT, Paris, France

Filed Oct. 19, 1987, Ser. No. 110,116
Claims priority, application France, Oct. 23, 1986, 86 14715
Int. Cl.[4] G09F *3/30*
U.S. Cl. 313—507 **6 Claims**



1. Electroluminescent display device comprising on an insulating support (10) an electroluminescent layer (16) and a photoconductive layer (20), said layers being stacked on one another, the two layers being inserted between two systems of electrodes (12,22) connected to a voltage supply source (24) permitting the excitation of certain zones of the electroluminescent layer, said device being characterized in that the photoconductive layer is of hydrogenated and carbonated amorphous silicon a-Si_xC_{1-x}:H, wherein 1−x is between 0.05 and 0.50.

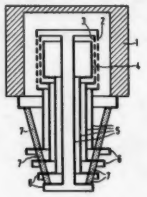
4,877,996

ELECTRON TUBE WITH CONTROL ELECTRODE REMOTE FROM ANODE

Dirk van Houwelingen, and Jozephus J. M. Warringa, both of Heerlen, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Continuation of Ser. No. 91,288, Aug. 27, 1987, abandoned, which is a continuation of Ser. No. 853,591, Apr. 18, 1986, abandoned. This application Mar. 13, 1989, Ser. No. 323,111
Claims priority, application Netherlands, May 2, 1985, 8501242
Int. Cl.[4] H01J *1/46, 17/12, 19/38*
U.S. Cl. 313—592 **5 Claims**

1. An electron tube comprising an evacuated envelope containing:
a. an electron-receiving anode;
b. an electron-emitting cathode spaced from the anode for emitting an electron current which flows to the anode under the influence of an electric field in a region between the cathode and the anode, the cathode including a multiplicity of apertures extending therethrough from a side facing the anode to a remote side of said cathode; and
c. a control electrode disposed adjacent the remote side of the cathode for producing an electric field extending through the apertures of the cathode and into said region;
said control electrode and said cathode being arranged with respect to each other such that the spacing therebetween varies with distance along said control electrode and affects the penetration of said electric field into said region, said spacing being dimensioned to optimize power output control of the tube as a function of a voltage applied to said control electrode.

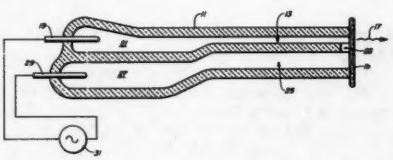


4,877,997

HIGH BRIGHTNESS AND VIEWED GAS DISCHARGE LAMP

Michael E. Fein, Mountain View, Calif., assignor to Tencor Instruments, Mountain View, Calif.

Filed Feb. 18, 1988, Ser. No. 157,731
Int. Cl.[4] H01J *61/30, 61/52*
U.S. Cl. 313—634 **22 Claims**



1. An end viewed low pressure gas discharge lamp comprising:
an elongated envelope including a small bore capillary tube and a second tube in communication with said capillary tube, said second tube defining a return path parallel to said capillary tube and connecting via a cross channel to said capillary tube, an outside wall of said capillary tube being in direct contact with a cooling medium,
an electrically excitable gas in said capillary tube,
a substantially planar window disposed on an end of said capillary tube adjacent to said cross channel for observing therethrough light emitted by said excitable gas, and
a pair of spaced apart electrode means sealed hermetically through said envelope for producing a discharge through said capillary tube between said pair of electrodes, one of said electrode mens being at an end of said capillary tube opposite from said window, the other of said electrode means being in said return path.

4,877,998

COLOR DISPLAY SYSTEM HAVING AN ELECTRON GUN WITH DUAL ELECTRODE MODULATION

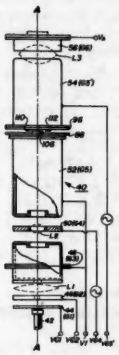
Loren L. Maninger, Lancaster, Pa.; David A. New, Mercerville, N.J., and Carl L. Lundvall, II, Lancaster, Pa., assignors to RCA Licensing Corp., Princeton, N.J.

Filed Oct. 27, 1988, Ser. No. 263,454
Int. Cl.[4] H01J *29/46, 29/56*
U.S. Cl. 315—15 **13 Claims**

1. In a color display system including a cathode-ray tube having an envelope with an inline electron gun therein for generating and directing three inline electron beams along initially coplanar paths towards a screen on an interior surface portion of said envelope, said gun including a plurality of

spaced electrodes which provide a first lens, a second lens and a third lens for focusing said electron beams, said first lens including a beam-forming region for providing substantially symmetrical beams to said second lens, said system including a magnetic deflection yoke that produces an astigmatic magnetic deflection field, the improvement comprising

means for applying at least a first dynamic voltage signal to



a first modulation electrode of said second lens electrodes, and

means for simultaneously applying a second dynamic voltage signal to a second modulation electrode of said third lens, said second modulation electrode being electrically separate from said first modulation electrode, said first and second signals being related to deflection of the electron beams.

4,877,999

METHOD AND APPARATUS FOR PRODUCING AN HF-INDUCED NOBLE-GAS PLASMA

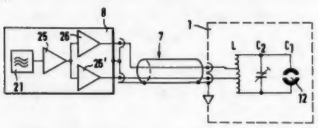
Gunter Knapp, and Andreas Schalk, both of Graz, Austria, assignors to Anton Paar KG, Graz, Austria

Continuation of Ser. No. 931,031, Nov. 17, 1986, abandoned. This application Apr. 7, 1988, Ser. No. 180,590

Claims priority, application Austria, Nov. 15, 1985, 3342/85

Int. Cl.[4] H01J *7/24*

U.S. Cl. 315—248 **16 Claims**



1. An apparatus for producing an HF-induced noble gas plasma, comprising:

an HF generator for generating a high frequency output signal; and

an oscillation circuit including an inductor and at least one primary capacitor, said oscillation circuit receiving said high frequency output signal, and said primary capacitor comprising at least two capacitor plates positioned with respect to one another so as to define a cavity therebetween through which a noble gas flows at substantially atmospheric pressure.

4,878,000

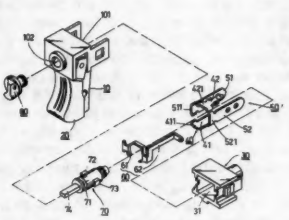
IMPROVED TRIGGER-TYPE CONTROL SWITCH FOR D.C. MOTORS

Shang-Hsieh Chen, 27 Chung Shan Rd., Sec. 3, Tantzu Hsiang, Taichung Hsien, Taiwan

Filed Jun. 21, 1988, Ser. No. 209,692

Int. Cl.[4] H02P *3/12*

U.S. Cl. 318—362 **3 Claims**



2. In an improved triggering switch of the type having a base support, a pressing member operatively attached to the base support, a non-conductive coupling stand with an open section disposed in an upper portion of the base support, a set of motor terminals and power source terminals, together with a contact shaft, installed in the open section of the coupling stand, and a selection button adjustably disposed on the upper portion of the base support and movably engaged with the contact shaft, the improvement comprising a braking means integrally formed together with a negative terminal of the motor terminals for being connected to a positive terminal of the motor terminals through a backward movement of the contact shaft so as to cause a short-circuit to the motor terminals and effect an immediate stop of the motor.

4,878,001

DRIVE CONTROL DEVICE FOR MOTOR ACTUATOR IN AUTOMOBILE AIR CONDITIONER

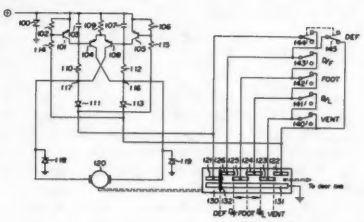
Hirofumi Hagikura, and Haruki Kawamoto, both of Tokyo, Japan, assignors to Nihon Radiator Co., Ltd., Tokyo, Japan

Filed Mar. 28, 1988, Ser. No. 174,178

Claims priority, application Japan, Mar. 30, 1987, 62-74224

Int. Cl.[4] B60H *3/00*

U.S. Cl. 318—446 **2 Claims**



1. A drive control device for a motor actuator in an automobile air conditioner for controlling opening and closing operations of doors to be installed in said automobile air conditioner, said drive control device comprising:

a series of plural switches connected in series to each other, wherein when one of said switches for setting an opening degree of one of said doors is opened, all of the other switches for setting the other opening degree of the other doors are closed;

a first sliding member provided with a plurality of separate contacts located in separation from each other, each of said separate contacts being connected to a terminal of

each said switch, and provided with a main contact connected to one terminal of a power source;

a second sliding member adapted to be moved relative to said first sliding member and into contact with said main contact and any of said separate contacts;

a motor for driving said doors to open and close the same and moving either of said first sliding member or said second sliding member;

a first transistor connected to one input terminal of said motor and any one of said separate contacts provided on said first sliding member, said first transistor being connected to the other terminal of said power source;

a second transistor connected to the other input terminal of said motor and any one of said separate contacts provided on said first sliding member, said second transistor being connected to the other terminal of said power source; and

first and second switching circuits for switching said first transistor and said second transistor, respectively, wherein said motor is controlled by said first and second switching circuits from a timing when any one of said switches is opened to a timing when said second sliding member comes into contact with both the main contact and the adjacent separate contacts contacted both the terminals of said switch opened, and when said second sliding member comes into contact with the main contact and the adjacent separate contacts, said first and second transistors are turned off by said first and second switching circuits.

4,878,002

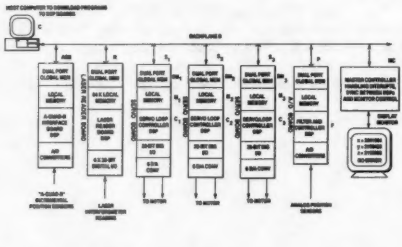
MULTI-AXIS DSP-BASED PARALLEL PROCESSING SERVO CONTROLLER FOR MACHINE TOOLS AND ROBOTS

Eric Heatzig, Watertown, Mass.; Alexander Slocum, and Debra Thurston-Slocum, both of McLean, Va., assignors to Advanced Engineering Systems, Operations & Products, Inc., Concord, N.H.

Filed Oct. 27, 1988, Ser. No. 263,503

Int. Cl.[4] G05B *19/42*

U.S. Cl. 318—568.2 **9 Claims**



1. A multi-axis DSP-based servo controller system for positioning motor-driven carriages and similar devices in response to multi-axis position-sensing readings as by optical encoders, laser interferometers, and analog position sensors, the system having, in combination, three types of sensor interface boards consisting of an A quad B incremental position sensor reading board, a multi-axis positioning-sensing reader board, an analog-to-digital (A/D) conversion board, and a plurality of multi-axis DSP based servo boards for executing digital control algorithms and outputting analog control voltages, one DSP servo board for each motor associated with one axis, and each board having a dual port memory and a local memory; a multiple bus backplane interconnected with the dual port memory of each of the sensor interface boards such as to enable inter-board communication and parallel processing; means for applying the multi-axis position data read by the A quad B incremental position sensor reader board and stored in its dual port memory by way of the bus backplane to each servo board for storage in each servo board dual port memory; means for transferring the position data thus stored in each servo board dual port memory to its own local memory; means for feeding the analog position sensed information of the A/D board stored in its local and dual port memory from the latter by way of the bus backplane for storage in each servo board dual port memory; each servo board having servoloop controller DSP means responsive to the position values in its local memory to perform its control loop algorithm while up-dated position data in the positions-ensing board dual port memory is transferred into the dual port memory of the servo board; each servo board having digital-to-analog (D/A) converter means connected to receive output commands from its servo-loop controllers and in turn connected to motor amplifiers means for controlling the corresponding axis motor; each servo board being provided with a self-turning algorithm to find optimal control constants for a physical system connected to the controller.

4,878,003

PROCESS AND INSTALLATION FOR THE AUTOMATIC CONTROL OF A UTILITY VEHICLE

Hans-Reinhard Knepper, Oberhausen, Fed. Rep. of Germany

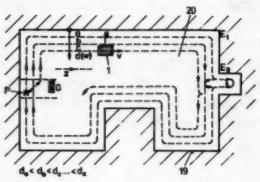
PCT No. PCT/CH86/00143, § 371 Date Jun. 10, 1987, § 102(e) Date Jun. 10, 1987, PCT Pub. No. WO87/02483, PCT Pub. Date Apr. 23, 1987

PCT Filed Oct. 14, 1986, Ser. No. 75,811

Claims priority, application Switzerland, Oct. 15, 1985, 4429/85-1

Int. Cl.[4] G05D *1/02*

U.S. Cl. 318—587 **41 Claims**



1. A method for the automatic control of a utility vehicle over an area having a stationary guide structure where the vehicle is operationally associated with said structure in at least an intermittent manner to effect guidance, characterized by including the steps of:

said vehicle laying down a detectable track on the surface of said area to identify its path or movement;

detecting the distance of said vehicle relative to said track; and exerting closed-loop feedback control over the vehicle and utilizing the distance data as one input to the closed-loop feedback control;

said method being further characterized in that the distance to the guide structures is obtained by determining the distance between the guide structure and the vehicle in at least two fixed vehicle axes; utilizing the distance along one of said axes as an input to the closed loop feedback control; and utilizing the distance along the other one of said axes as a control variable for selectively driving and steering the vehicle.

3. A method for the automatic control of a utility vehicle over an area having a stationary guide structure and where the vehicle is operationally associated with said structure at least intermittently to effect guidance of the vehicle, characterized by including the steps of:

maintaining the distance between the vehicle and the guide structure by means of closed-loop feedback control; and

obtaining a nominal distance value for use as a command value by the closed-loop feedback control and varying said value according to detection of the guide structure;

said method being further characterized by including detecting when the vehicle moves upon an area it has already traversed to alter its path and moving the vehicle further

away from the guide structure by varying the nominal distance value whereby the vehicle traverses a substantially spiral-shaped path.

41. A utility vehicle with an apparatus for its automatic control when moving over an area comprising:

drive means for moving said vehicle;

steering means for steering the vehicle as it moves;

trace generating means to lay down a detectable trace on said area as the vehicle moves on said area;

detecting means arranged on said vehicle and substantially shifted to one of its lateral sides for detecting a border of said last-mentioned trace, said detecting means generating a control signal for operating at least one of said drive means and a steering means so that said vehicle follows said border laterally shifted with respect to said one of its lateral sides.

4,878,004

MOTOR-OPERATED POWER STEERING APPARATUS

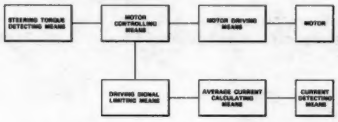
Yasuo Shimizu, Tochigi, Japan, assignor to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Apr. 20, 1988, Ser. No. 183,813

Claims priority, application Japan, Apr. 20, 1987, 62-98257

Int. Cl.[4] G05B *11/28*

U.S. Cl. 318—599 **6 Claims**



1. A motor-operated power steering apparatus comprising:

an electric motor for generating an assistive force to be applied to a steering force transmitting mechanism;

a detector for detecting a vehicle operating condition of a steering wheel;

motor controlling means responsive to a signal from said detector for producing a drive signal to control operation of said electric motor;

motor driving means responsive to said drive signal for driving said electric motor;

current detecting means for detecting a magnitude of a current flowing through said electric motor and for producing a signal indicating the detected magnitude of the current;

average current detecting means for calculating an average value of the currents flowing through said electric motor in a prescribed period of time based on the signal from said current detecting means;

upper limit determining means for determining an upper limit for the drive signal from said motor controlling means based on said average current; and

driving signal limiting means for comparing said drive signal with said upper limit and for limiting a maximum value of the drive signal to a value less than said upper limit.

4,878,005

SERVO SYSTEM

Shigeyuki Takagi, Gifu, Japan, assignor to Teijin Seiki Co., Ltd., Japan

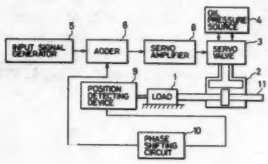
Filed Feb. 26, 1988, Ser. No. 161,052

Claims priority, application Japan, Feb. 27, 1987, 62-44846

Int. Cl.[4] G05B *6/02*

U.S. Cl. 318—621 **5 Claims**

1. In servo system comprising an adder receiving an input instruction on a first input thereof, a servo amplifier having an output coupled to drive a load system, and a feedback loop for providing an error signal to a second input of said adder, the improvement comprising phase shifting means connected in said feedback loop for imparting a phase lag characteristic at a



resonance frequency of said load system in a range of −270° to −360°.

4,878,006

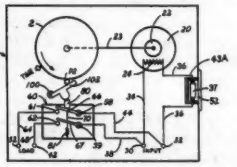
MULTI-VOLTAGE MOTOR AND TIMER CLOCK

Carl L. C. Kah, Jr., 778 LakesideDr., North Palm Beach, Fla. 33408

Filed Feb. 16, 1988, Ser. No. 156,287

Int. Cl.[4] H02P *7/40*

U.S. Cl. 318—770 **25 Claims**



1. A method for use in determining a capacitance to be placed in series with the coil of an alternating current electric motor, having a small range of acceptable voltages on each side of a design voltage, to increase the range of voltages at which the motor can operate including two known voltages:

(1) place a small known capacitance in series with said coil;

(2) apply a first increased known operating voltage across said coil and capacitance;

(3) determine that the motor started and ran at required speed against the required output torque, if it did not add capacitance until it does;

(4) measure the voltage across the coil to determine that the voltage is an acceptable value compared to the design voltage;

(5) apply a second increased known operating voltage across said coil and capacitance;

(6) measure the voltage across the coil to determine that it is a value which does not exceed the maximum design voltage of the motor for proper heat distribution;

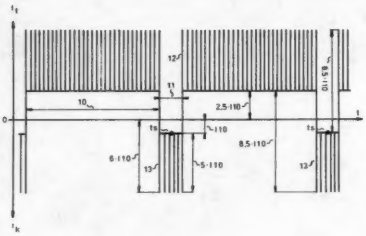
(6A) If the voltage in step (6) is a value below maximum acceptable voltage, then the capacitance of step (5) is a capacitance that can be used to increase the range of voltages at which the motor can operate;

(6 (B) If the voltage in step (6) is a value above maximum acceptable voltage, then the capacitance of step (5) is a capacitance that cannot be used to increase the range of voltages at which the motor can operate.

4,878,007
METHOD FOR CHARGING NICKEL-CADMIUM BATTERIES AND CIRCUIT ARRANGEMENT FOR CARRYING OUT THE METHOD

Szóradi Gábor, and Nagy Sándor, both of Budapest, Hungary, assignors to BRG Mechatronikai Vallalat, Hungary

Filed Nov. 30, 1987, Ser. No. 126,887
Claims priority, application Hungary, Dec. 1, 1986, 4949/86
Int. Cl.[4] H02J 7/00, 7/10
U.S. Cl. 320—14 9 Claims



1. A method for charging nickel-cadmium batteries comprising the steps of supplying said battery during charging periods of a predetermined first duration with a predetermined charging current, and loading said battery during discharging periods of a shorter predetermined second duration with a predetermined loading current, and alternatingly repeating said supplying and loading steps, wherein said supplying step includes superimposing on said charging current a charging current pulse of the same sense, at least at the beginnings of said charging periods, and wherein said loading step includes superimposing on said loading current a discharging pulse, at least at the beginning of said discharging periods, and providing thereby at the beginning of each of said periods a current charge in amperes which is in absolute magnitude at least seven times as high as one tenth of the numerical value of the storage capacity of said battery when expressed in ampere-hours, wherein in the respective periods a plurality of pulses are superimposed on the predetermined charging and/or discharging currents which have energy and amplitude values at most equal to the corresponding values of the pulse at the beginning of the period.

4,878,008
CONTOUR-CLAMPED HOMOGENEOUS ELECTRIC FIELD GENERATOR

Charles W. Ragsdale, Concord, Calif., assignor to Bio-Rad Laboratories, Inc., Richmond, Calif.

Filed Apr. 21, 1988, Ser. No. 184,514
Int. Cl.[4] G05F 1/46
U.S. Cl. 323—271 57 Claims

1. A circuit for maintaining a DC voltage at a prescribed level comprising:

oscillating means for generating a pulse train having a duty cycle;

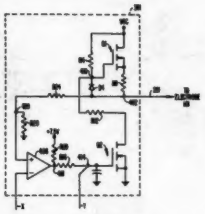
first converting means, coupled to the oscillating means, for converting the pulse train into a first DC voltage at a first node;

second converting means, coupled to the first node, for converting the first DC voltage into a second DC voltage at a second node;

comparing means, coupled to the second converting means, for comparing the second DC voltage to a prescribed voltage level;

maintaining means, responsive to the comparing means, for maintaining the second DC voltage at the prescribed level by selectively causing the oscillating means to increase and decrease the duty cycle of the pulse train, the maintaining means comprising:

a first transistor having an input terminal coupled to a current source and an output terminal coupled to the second node for flowing a current into the second node; and

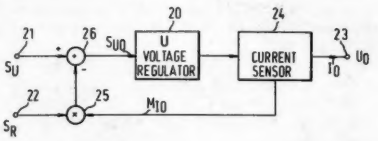


a second transistor having an input terminal coupled to the second node for flowing current away from the second node.

4,878,009
VOLTAGE SOURCE HAVING PRESET VALUES FOR SOURCE VOLTAGE AND INTERNAL RESISTANCE

Wolfgang Esser, and Peter Jung, both of Paderborn, Fed. Rep. of Germany, assignors to Nixdorf Computer AG, Paderborn, Fed. Rep. of Germany

Filed Jul. 29, 1988, Ser. No. 226,168
Claims priority, application Fed. Rep. of Germany, Jul. 30, 1987, 3725348
Int. Cl.[4] G05F 1/46
U.S. Cl. 323—275 17 Claims



1. A voltage source for delivering an electrical output and having preset values for the source voltage and internal resistance comprising:

regulating means for regulating said electrical output in accordance with a reference parameter; and

computing circuit means coupled with said regulating means for calculating said reference parameter based on the value of said electrical output and said preset values.

4,878,010
ELECTRIC A.C POWER SWITCH CONTROLLER AND D.C. POWER SUPPLY METHOD AND APPARATUS

Harold J. Weber, 20 Whitney Dr., Sherborn, Mass. 01770

Filed Dec. 10, 1987, Ser. No. 131,096
Int. Cl.[4] G05F 5/00
U.S. Cl. 323—300 20 Claims

8. Electric alternating current (a.c.) power control and direct current (d.c.) power supply means comprising:

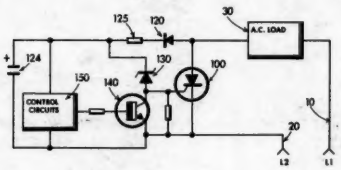
a. source of alternating current electric power;

b. a.c. load;

c. thyristor means having a first power terminal including a gate associated therewith, and a second power terminal, whereby said power terminals are coupled effectively in series with at least said a.c. load and said source of electric power, producing a switchable conductive path therebetween;

d. voltage responsive means and current limiting means effectively coupled in series between said gate and said second power terminal, whereby when any voltage appearing across the voltage responsive means is below a predetermined threshold level no substantial gate current is admitted to the gate of the thyristor means and the thyristor means is maintained non-conductive and essentially OFF, whilst the moment said voltage appearing across the voltage responsive means exceeds the predetermined threshold level gate current is admitted to the means to initiate conduction through the thyristor means and essentially turn-ON the a.c. load for at least the remainder of the instant a.c. power half-cycle;

e. gate current diverting means coupled between the gate and the first power terminal of the thyristor means and having a control input thereto, whereby when a first control signal value is coupled with the diverting means any substantial gate current which may otherwise be



admitted to the gate by way of the voltage responsive means is shunted effectively to the first power terminal instead; and when a second control signal value is coupled with the diverting means any gate current which may be admitted to the gate by way of the voltage responsive means is thusly admitted;

f. rectifier means and capacitor means coupled effectively in series with said current limiting means and said first and second power terminals and effectively in parallel with the said voltage responsive means, thereby producing a relatively low voltage d.c. power value substantially across the capacitor means through rectification of at least a portion of the a.c. power appearing across said first and second power terminals in each the ON and OFF state thereof; and,

g. d.c. load coupled to the capacitor means to obtain d.c. power therefrom in each the ON state and OFF state operation of the control means.

4,878,011

PROPORTIONAL FIRING CIRCUIT

Roger A. Holtslander, Mount Clemens, Mich., assignor to Wolf Engineering Corporation, Dearborn, Mich.

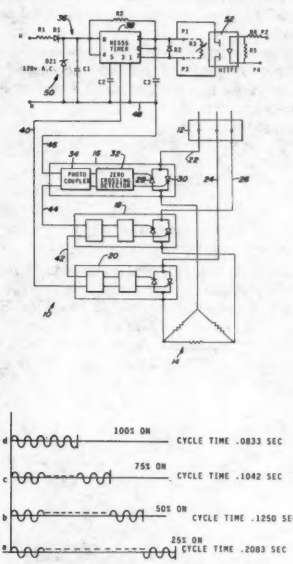
Filed Jul. 29, 1988, Ser. No. 226,224
Int. Cl.[4] G05B *24/02*; G05F *1/46*
U.S. Cl. 323—319 **13 Claims**

1. In an electrical switching apparatus having semiconductor controlled rectifier means for controlling the transmission of electrical power from an alternating power supply, a proportional firing circuit comprising:

input means for providing a variable signal whose magnitude is used to control the conduction of said semiconductor controlled rectifier means;

timer means for generating a firing signal for said semiconductor controlled rectifier means whose pulse timing is proportional to the variable characteristic of said variable signal, so as to enable the conduction time of said semiconductor controlled rectifier means to be proportionally varied between a minimum conduction time which is associated with the cycling of said alternating power supply and a maximum conduction time; and

zero crossing means receiving said firing signal of said timer means for permitting the conduction of said semiconductor controlled rectifier means only at zero crossing junctions in the alternating cycle of said power supply;



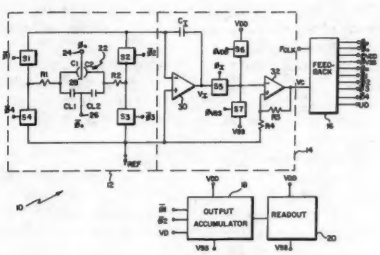
wherein said firing signal has a fixed pulse duration, and only the time between the pulses of said firing signal is varied in response to said variable input signal.

4,878,012

CHARGE BALANCED FEEDBACK TRANSMITTER

John P. Schulte, Eden Prairie; Kelly M. Orth, Apple Valley; Roger L. Frick, Chanhassen; Brian L. Westfield, Eden Prairie, and Randy K. Paschke, Chaska, all of Minn., assignors to Rosemount Inc., Eden Prairie, Minn.

Filed Jun. 10, 1988, Ser. No. 205,268
Int. Cl.[4] G01R *27/26*
U.S. Cl. 324—60 CD **25 Claims**



1. A measurement circuit for providing an output signal as a function of a parameter, the circuit comprising:

generating means for providing a generator signal which is formed by a plurality of charge packets and which is a function of the parameter, the generator means including reactance means for forming the charge packets; switching means for coupling the charge packets; and noise-sup-

pression means connected in series with the reactance means and the switching means;

measurement means coupled to the generating means for receiving the charge packets and measureing the generator signal to provide a measurement signal as a function thereof;

feedback means coupled to the measurement means as a function of the measurement signal to control the generator means such that the generator signal tends toward a charge-balanced state;

output means for providing the output signal as a function of a count of a number of charge packets contained in the generator signal.

4,878,013

CAPACITIVE TYPE MEASUREMENT TRANSDUCER WITH IMPROVED ELECTRODE ARRANGEMENT

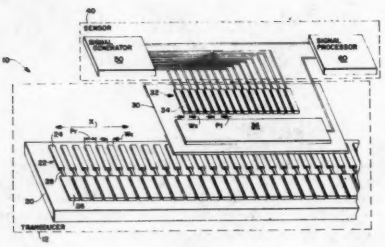
Nils I. Andermo, Kirkland, Wash., assignor to Mitutoyo Corporation, Tokyo, Japan

Continuation-in-part of Ser. No. 30,346, Mar. 26, 1987, abandoned. This application May 31, 1988, Ser. No. 200,580

Claims priority, application Japan, Apr. 4, 1986, 61-78948

Int. Cl.[4] G01R *27/26*; G08C *19/16*

U.S. Cl. 324—61 R **10 Claims**



1. Capacitive-type measuring apparatus comprising:

first and second support members, said support members being relatively displaceable with respect to each other, and at least one of said support members being displaceable relative to a measurement axis;

first and second electrode arrays mounted on said first and second support members, respectively, in alignment with said measurement axis, for producing a varying capacitance pattern in dependence on the relative positions of said support members with respect to each other;

said first electrode array comprising a series of discrete first electrodes uniformly spaced with a pitch P_r defining a scale wavelength;

said second electrode array comprising a series of discrete second electrodes disposed so as to be capacitively coupled to differing portions of said first electrode array in dependence on the relative positions of said support members; and

said second electrodes being arranged so as to define a plurality of measuring element groups separated from each other by a group pitch Pg, and wherein each electrode group has N measuring elements, N being an integer greater than 2, and the second electrodes forming each of said electrode groups are positioned within the respective groups so as to respectively occupy predetermined group positions which are spread over a distance greater than one scale wavelength, and each of which corresponds to the relative position of a different one of a group of relative scale wavelength segments obtained by dividing the group pitch into intervals corresponding to the scale wavelength and dividing each interval into N equal segments;

signal generator means for applying at least one combination of N periodic excitation signals to the second electrodes in each of said electrode groups such that said excitation signals are respectively applied to corresponding ones of the second electrodes in each group in a relative order corresponding to the sequence of relative scale wavelength segment positions occupied by the electrodes in each group; and

detector means comprising:

detector electrode means for sensing the output signals produced by the first electrodes capacitively coupled to said second electrode array in response to said at least one combination of excitation signals, and for producing an output signal which represents a sum of the sensed first electrode output signals; and

signal processing means for deriving measurement data from said detector electrode means output signal.

4,878,014

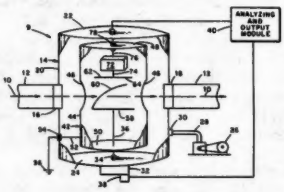
ION BEAM PROFILE SCANNER HAVING SYMMETRIC DETECTOR SURFACE TO MINIMIZE CAPACITANCE NOISE

Michael L. Simpson, Knoxville, Tenn., assignor to Oak Ridge Associated Universities, Oak Ridge, Tenn.

Continuation-in-part of Ser. No. 203,716, Jun. 7, 1988, abandoned. This application Sep. 1, 1988, Ser. No. 239,454

Int. Cl.[4] G01N *27/00*

U.S. Cl. 324—71.3 **23 Claims**



1. A particle beam profile scanner for scanning the profile of a particle beam, comprising:

a probe constructed of a material that will emit electrons when struck by the particle beam;

drive means for passing said probe through the particle beam whereby said probe, when struck by the particle beam, emits electrons in proportion to the number of particles striking said probe;

detection means for detecting the electrons emitted from said probe;

means for applying a positive charge to said detection means so that electrons emitted from said probe are attracted to and received by said detection means;

a surface disposed on said detection means and being configured and oriented with respect to said probe to minimize changing capacitance noise, said surface being configured and oriented to offer a subbstantially symmetric view to said probe as said probe moves through the particle beam;

circuit means connected to said surface for carrying an electric current that is comprised of the electrons emitted from said probe and received by said detection means; and

output means for receiving the electric current from the circuit means and for generating output data corresponding to the electric current.

4,878,015

SENSORS FOR SELECTIVELY DETERMINING LIQUID-PHASE OR GAS-PHASE COMPONENTS USING A HETEROPOLYSILOXANE SENSITIVE LAYER

Helmut Schmidt, Zellingen; Frank Hutter, Würzburg; Karl-Heinz Haas, Theilheim; Ernst Obermeier, Kaufbeuren; Ulrich Steger, Munich; Hanns-Erik Endres, Munich, and Stephan Drost, Munich, all of Fed. Rep. of Germany, assignors to Fraunhofer-Gesellschaft zur Forderung der angewandten Forschung e.V., Munich, Fed. Rep. of Germany

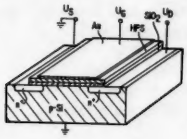
PCT No. PCT/EP86/00436, § 371 Date Mar. 23, 1987, § 102(e) Date Mar. 23, 1987, PCT Pub. No. WO87/00633, PCT Pub. Date Jan. 29, 1987

PCT Filed Jul. 23, 1986, Ser. No. 44,506

Claims priority, application Fed. Rep. of Germany, Jul. 23, 1985, 3526348

Int. Cl.[4] G01N *27/00*

U.S. Cl. 324—71.5 **26 Claims**



1. Sensor for selectively determining liquid-phase or gas-phase components in the form of a field effect transistor, comprising a semiconductor substrate; at the surface of the semiconductor substrate at least two drain and source regions with a dopant type opposite the semiconductor substrate and separated by a channel; drain and source electrodes which are in electrically conducting contact with said drain and source regions; a gate insulator layer on the channel; a sensitive layer consisting of a heteropolysiloxane on the gate insulating layer, it being possible for the sensitive layer to come into contact with the components to be determined; and a gate or reference electrode.

4,878,016

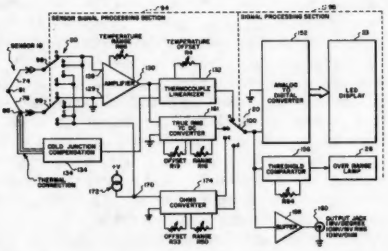
SOLDERING IRON TESTING METHOD AND APPARATUS

William Wahl, Culver City, and Kenneth G. Junkert, Woodland Hills, both of Calif., assignors to Wahl Instruments, Inc., Culver City, Calif.

Filed Aug. 23, 1988, Ser. No. 235,371

Int. Cl.[4] G01R *15/12, 31/02;* G01K *1/14*

U.S. Cl. 324—73 R **7 Claims**



1. Apparatus, useful in combination with a soldering iron having a working tip nominally connected to electrical ground, for measuring the (1) tip temperature (2) tip voltage to ground, and (3) tip resistance to ground, said apparatus comprising:

sensor means including first and second dissimilar metal wires each having first and second ends with said first ends being joined at a junction to form a thermocouple;

means mounting said sensor means with said junction readily accessible for contact by said working tip;

temperature measuring means responsive to an applied input voltage for producing an output voltage related thereto;

voltage measuring means responsive to an applied input voltage for producing an output voltage related thereto;

resistance measuring means including current source means for supplying a constant current to a load terminal and means for producing an output voltage related to the voltage drop produced between ground and said load terminal; and

switching means operable in a temperature mode for applying the voltage between said first and second wire second ends to said temperature measuring means; operable in a voltage mode for electrically shorting said first and second wire second ends and applying the resulting shorted voltage appearing between the shorted second ends and ground to said voltage measuring means; and operable in a resistance mode for electrically shOrting said first and second wire second ends and connecting said second ends to said resistance measuring means load terminal.

4,878,017

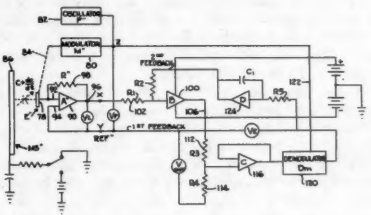
HIGH SPEED D.C. NON-CONTACTING ELECTROSTATIC VOLTAGE FOLLOWER

Bruce T. Williams, 454 South St., Lockport, N.Y. 14094

Filed Oct. 28, 1986, Ser. No. 924,054

Int. Cl.[4] G01R *5/28, 29/12*

U.S. Cl. 324—109 **15 Claims**



1. A non-contacting electrostatic voltage follower comprising:

a) a single detector electrode sensitive to electrostatic quantities such as electrostatic fields, voltages or charges having continuous capacitive coupling to a surface;

b) means operatively associated with said electrode for varying the capacitive coupling between said electrode and said surface bearing an electrostatic quantity to which said electrode is capacitively coupled;

c) a detector amplifier having first and second inputs and an output, said amplifier having a high input impedance;

d) means for connecting said detector electrode to said first input of said detector amplifier;

e) a high bandwidth amplifier having an input and an output;

f) means for applying the output of said detector amplifier to the input of said high bandwidth amplifier; and

g) means for providing a first feedback path from said output of said high bandwidth amplifier to said second input of said detector amplifier in a manner producing at the output of said high bandwidth amplifier signals having dynamic components matching all dynamic components of electrostatic quantities on said surface;

h) whereby the magnitude and phase of said signals produced by said output of said high bandwidth amplifier

provide information as to the magnitude and polarity of said electrostatic quantities borne by said surface.

4,878,018

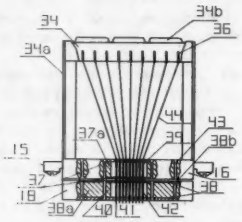
ELECTRICAL TESTING DEVICE

James T. Malloy, 50 Swede Creed Rd., Oak Run, Calif. 96069

Continuation-in-part of Ser. No. 834,367, Feb. 28, 1986, abandoned. This application Dec. 11, 1987, Ser. No. 131,924

Int. Cl.[4] G01R *1/06, 31/02*

U.S. Cl. 324—158 F 8 Claims



5. A circuit analyzer comprising,

a plurality of electrical test points simultaneously contacted with electrically conductive probes, individual probes being in registration with individual test points and adjacent test points being spaced apart and distance ranging between 0.005 inch and 0.050 inch,

said probes being aligned with each other generally in parallel and being made of a spring quality, wire-type conductive material having a diameter ranging between 0.001 and 0.050 inch

each probe being disposed within a movably mounted housing, each probe having a bend therein that engages the housing, and each probe having a test point contact end and a free end, said bend inhibiting the relative movement between the probe and housing,

means for simultaneously moving the housing of each probe towards and away from the test points,

an electrical connector for each probe for individually connecting each probe to the circuit analyzer, and

each electrical connector being in registration with an individual probe, with each probe being disposed between the test point and the connector of said probe, and each electrical connector including a conductive tubular member having at one end an electrical contact electrically connected to the circuit analyzer and opposite said one end an open tip which receives the free end of the probe.

4,878,019

ELECTRICAL SENSING SYSTEM FOR MEASURING FERROUS PARTICLES WITHIN A FLUID WITH TEMPERATURE COMPENSATION CIRCUIT

Edward Tsaprazis, Havertown; Nicholas P. Maris, Lafayette Hills, and Charles Montague, Media, all of Pa., assignors to Aeroquip Corporation, Jackson, Mich.

Continuation-in-part of Ser. No. 729,759, May 2, 1985, Pat. No. 4,731,578. This application Aug. 31, 1987, Ser. No. 91,576

Int. Cl.[4] G01N *27/74;* G01R *33/12*

U.S. Cl. 324—204 3 Claims

1. A means for sensing ferrous contamination in a fluid comprising:

(a) a generally cylindrical magnet;

(b) an electrical coil located co-axially on one end of said magnet, said coil having a hole lengthwise through its center;

(c) a pole piece of said magnet occupying the hole in said first coil and concentric with said magnet disposed at one end of the magnet, said pole piece of the magnet being available to accumulate ferrous contamination present in a fluid whereby any ferrous accumulation changes the induction of the coil;

(d) An electronic circuit means for measuring inductance changes of said electrical coil including;

a clock oscillator means providing two discrete frequencies, one high frequency and one low frequency;

a frequency selection means to select, upon command, one of the two frequencies of the said clock oscillator means;

a waveform generator;

a waveform period counter which switches between one of two states corresponding to said high frequency and said low frequency of said clock oscillator;

a sample and hold counter control means operatively connected to said waveform period counter;

a first sample and hold amplifier;

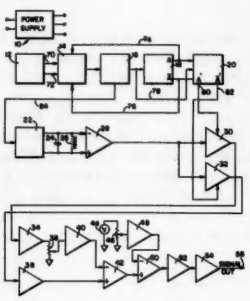
a second sample and hold amplifier;

a constant current coil driver circuit driving a tuned circuit having a resonant frequency between said high frequency and said low frequency, said tuned circuit including said electrical coil;

a first differential amplifier; and

a second differential amplifier;

wherein said clock oscillator is operatively connected to the frequency selection means, and said frequency selection means alternatively selects said high and low frequency from said oscillator means to introduce such frequency into the waveform generator, said waveform generator producing a frequency output proportional to the said selected high or low frequency and introducing said proportional output to the said coil driver constant current circuit, and the said waveform period counter;



wherein further said constant current driver provides a constant current to said tuned circuit, the output of said tuned circuit being placed across the input of said first differential amplifier such that the output of said amplifier represents the voltage across said tuned circuit;

the output of said amplifier being introduced to the input of said first and second sample and hold amplifiers, said first sample and hold amplifier driving an inverting input of said second differential amplifier and said second sample and hold amplifier driving a non-inverting input of said second differential amplifier said second differential amplifier providing an output proportional to inductance changes of said electrical coil;

wherein further said first and second sample and hold amplifiers are commanded through said sample and hold counter control means to sample and hold by said waveform period counter in a manner corresponding to said high frequency and said low frequency of said clock oscillator means.

4,878,020

METHOD AND DEVICE FOR MEASURING THE DISTANCE BETWEEN THE DISCS OF A REFINER USING A MEASUREMENT OF THE MAGNETIC FLUX INDUCED BETWEEN THE DISCS

Juhani Kärnä, and Heikki Pahlman, both of Tampere, Finland, assignors to Sunds Defibrator Jylha Oy, Valkeakoski, Finland

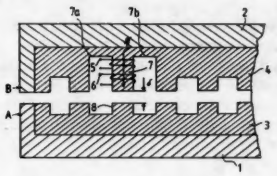
PCT No. PCT/FI87/00132, § 371 Date Jun. 14, 1988, § 102(e) Date Jun. 14, 1988, PCT Pub. No. WO88/03054, PCT Pub. Date May 5, 1988

PCT Filed Sep. 30, 1987, Ser. No. 207,156

Claims priority, application Finland, Oct. 31, 1986, 86443

Int. Cl.[4] B02C *7/14*; G01B *7/14*

U.S. Cl. 324—207 19 Claims



1. A method for measuring the distance δ between discs in a refiner, each of said discs having at least one tooth, said method comprising:

generating a magnetic field by means of first coil means formed at least at one refiner-disc tooth of a first disc, said magnetic field being allowed to run at least partly through a second disc, the second disc comprising a tooth;

detecting, by means of a second, coil means formed around the tooth of the first disc, the magnetic flux caused by the first coil means running over the distance between two opposite teeth of the first and second discs, respectively;

outputting a signal representing the detected magnetic flux; and

interpreting the signal as a quantity that expresses distance δ between the teeth.

4,878,021

MAGNETIC RESONANCE SPECTROSCOPY STUDIES OF RESTRICTED VOLUMES

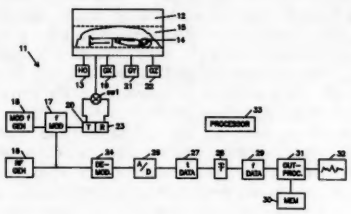
Joseph Granot, Holon, Israel, assignor to Elscint Ltd., Haifa, Israel

Filed Oct. 11, 1988, Ser. No. 256,403

Claims priority, application Israel, Oct. 12, 1987, 84152

Int. Cl.[4] G01R *33/20*

U.S. Cl. 324—309 22 Claims



1. A magnetic resonance spectroscopic (MRS) method for accurately locating a region of interest within a subject, said method comprising the steps of:

applying a first set of two 90° RF pulses during the application of a first gradient pulse of substantially constant value to saturate with each pulse of said first set of two 90° RF pulses a different unwanted region in a first direction leaving as a first unsaturated region in said first direction a region unaffected by either of said first set of two 90° RF pulses,

applying a second set of two 90° RF pulses during the application of a second gradient pulse of substantially constant value to saturate with each pulse of said second set of two 90° RF pulses a different unwanted region in a second direction leaving as a second unsaturated region in said second direction a region unaffected by either of said second set of two 90° RF pulses such that only a selected region of interest at the intersections of said first and said second unsaturated regions contains unsaturated spins,

applying a 90° excitation pulse to excite said unsaturated spins in said selected region of interest, and

acquiring FID signals from said selected region of interest.

4,878,022

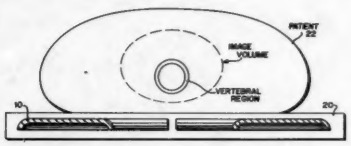
WIDENED AND SHAPED MRI SURFACE COIL HAVING INCREASED SIGNAL-TO-NOISE RATIO

Joseph W. Carlson, Kensington, Calif., assignor to The Regents of the University of California, Berkeley, Calif.

Filed Oct. 14, 1988, Ser. No. 257,801

Int. Cl.[4] G01R *33/20*

U.S. Cl. 324—318 10 Claims



1. An MRI RF coil for use in a magnetic resonance imaging system and including:

a conductive element for disposition with one side proximal an image area and another side distal thereto;

said conductive element having a flat portion on the proximal side and associated edges which curve away from the proximal side toward said distal side.

4,878,023

MAGNETIC RESONANCE APPARATUS COMPRISING AN IMPROVED GRADIENT COIL SYSTEM

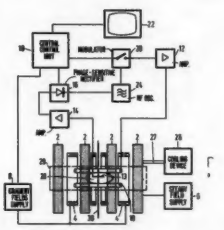
Johannes A. Overweg, and Cornelis L. G. Ham, both of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Aug. 17, 1988, Ser. No. 233,310

Claims priority, application Netherlands, Aug. 19, 1987, 8701948

Int. Cl.[4] G01R *33/20*

U.S. Cl. 324—318 21 Claims



1. A magnetic resonance apparatus comprising a magnet system for generating a steady magnet field parallel to a central axis in a measurement space and a gradient coil system for selectively generating a gradient magnetic field in said mea-

surement space superimposed on said steady magnetic field, said coil system comprising electrically series-connected effective and return art conductors lying in planes intersecting said central axis, said effective arc conductors contributing more substantially to the generation of said gradient magnetic field than said return arc conductors, characterized in that said return arc conductors are positioned to compensation for stray magnetic fields generated by said effective arc conductors.

4,878,024

MAGNETIC RESONANCE APPARATUS COMPRISING A LOW-NOISE GRADIENT COIL

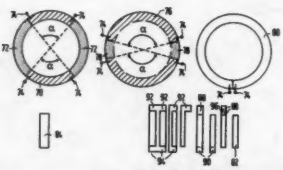
Johannes A. Overweg, and Cornelis L. G. Ham, both of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Aug. 17, 1988, Ser. No. 233,307

Claims priority, application Netherlands, Aug. 19, 1987, 8701947

Int. Cl.[4] G01R *33/20*

U.S. Cl. 324—319 11 Claims



1. A self-supporting gradient coil system for generating mutually perpendicularly directed gradient fields in a generally cylindrical measurement space, said system comprising a plurality of axially spaced-apart ring-shaped stacks of arc conductors, each stack comprising a plurality of arc conductors and insulating rings intermediate said arc conductors, and axially directed means for rigidly interconnecting said stacks.

4,878,025

TROUBLE FINDER FOR TESTING AN ELECTRICAL SYSTEM OF A VEHICLE FOR SHORT-CIRCUITING

Peter Persson, Tallvägen 75, S-902 Umeå , Sweden

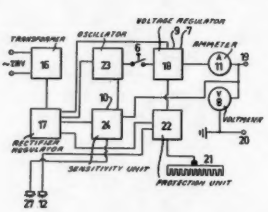
PCT No. PCT/SE87/00059, § 371 Date Aug. 11, 1988, § 102(e) Date Aug. 11, 1988, PCT Pub. No. WO87/04797, PCT Pub. Date Aug. 13, 1987

PCT Filed Feb. 9, 1987, Ser. No. 235,883

Claims priority, application Sweden, Feb. 11, 1986, 8600595

Int. Cl.[4] G01R *31/02*

U.S. Cl. 324—503 12 Claims



1. A trouble finder for testing an electrical system, comprising:

a transformer having an input adapted to be coupled to a power source;

a rectifier, coupled to an output of said transformer;

an oscillator unit coupled so as to receive power from said rectifier;

a regulator coupled to said rectifier so as to receive power therefrom;

means for coupling an output of said oscillator to an input of said regulator;

first and second output terminals for connection to said electrical system to be tested;

an ammeter coupling said voltage regulator to said first output terminal;

a voltmeter coupling said first and second output terminals;

a protection unit coupled to said regulator;

a sensitivity unit, connected to said first and second output terminals and arranged to enable sensing of a voltage across said output terminals, the output voltage deviating from zero upon connection of said trouble finder to an electrical system being tested;

a potentiometer, coupled to said sensitivity unit, for balancing the sensed voltage to zero level; and

wherein said oscillator unit is intended for limiting the output current of the regulator unit at an occurrence of a short-circuit in the electrical system, said oscillator unit being activated by a balanced 0-zero voltage level detected by the sensitivity unit.

4,878,026

MEASURING CIRCUIT OF THE DC COMPONENT OF THE CURRENT FLOWING THROUGH THE PRIMARY WINDING OF THE OUTPUT TRANSFORMER OF AN INVERTER

Philippe Moreau, Gieres, and Jean-Noël Fiorina, Grenoble, both of France, assignors to Merlin Gerin, France

Filed Dec. 28, 1987, Ser. No. 137,938

Claims priority, application France, Jan. 9, 1987, 87 00243

Int. Cl.[4] G01R *31/06*

U.S. Cl. 324—547 5 Claims

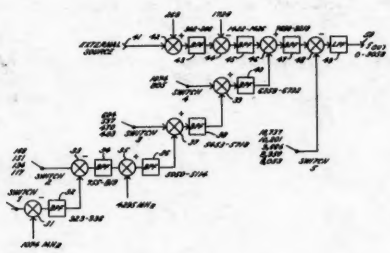
1. A measuring circuit of the D.C. component of the current flowing through the primary winding of the output transformer of an inverter, comprising a detection device producing a signal representative of the current flowing through said winding, an integrator designed to integrate said signal detected on a period of the A.C. component of the current, the integrator output signal being reset at the beginning of each of said periods and being applied to a sample and hold stage designed to sample it just before it is reset, in such a way as to supply on output a signal representative of the mean amplitude of the D.C. component present during the previous period and wherein the integrator output signal is applied to the sample and hold stage via an intermediate stage comprising a first operational amplifier whose positive input is grounded and whose negative input is connected to the integrator output by a first resistor and to the sample and hold stage input by a second resistor, a third resistor being arranged between the output of the first operational amplifier and the sample and hold stage input, in such a way as to limit the maximum possible variation of the measuring circuit output signal during the sampling period.

4,878,027

DIRECT FREQUENCY SYNTHESIZER USING POWERS OF TWO SYNTHESIS TECHNIQUES

Stuart L. Carp, Menlo Park; Howard L. Swain, Palo Alto, and Bich N. Nguyen, San Jose, all of Calif., assignors to Hewlett-Packard Company, Palo Alto, Calif.

Filed Aug. 3, 1987, Ser. No. 81,207
Int. Cl.[4] H03B 19/00; H03L 7/18
U.S. Cl. 328—15 24 Claims



1. A signal generator for producing an output signal having an output frequency determined by a digital control word, the signal generator comprising:

means for producing a plurality of sets of reference signals, each set having a plurality of reference signals each having a reference frequency differentiated from reference frequencies of other reference signals in the set by a multiple of an integral power of two;

a plurality of means for selecting, each receiving one or more selected bits of the digital control word and the reference signals from one set for selecting according to the digital control word one reference signal from each set as a selected signal having a selected frequency; and

means responsive to the selected signals for mathematically combining the selected frequencies of the selected signals to produce the output signal having the output frequency which is a mathematical combination of the selected frequencies of each selected signal, wherein application of selected bits to said means for selecting is delayed by a time unique to each said means for selecting, such that any changes in selection of reference signals caused by a change in the control word have simultaneous effect on said output signal.

4,878,028

TECHNIQUE FOR GENERATING PRECOMPENSATION DELAY FOR WRITING DATA TO DISKS

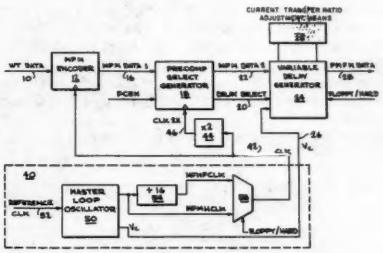
Yun-Che Wang, Saratoga, and Paul H. Scott, San Jose, both of Calif., assignors to Advanced Micro Devices, Inc., Sunnyvale, Calif.

Filed Feb. 12, 1987, Ser. No. 13,846
Int. Cl.[4] H03K 5/159, 5/13, 3/01
U.S. Cl. 328—55 17 Claims

1. Apparatus for generating a delay in the path of a data signal, for use in association with a delay selection signal (20), comprising:

at least a first (208) and a second (204) delay control node;

controlled delay means (FIG. 4A) inserted in the path of the data signal and having a controlled delay means current control port (A,B,C) coupled to an activated one (208 or 204) of the delay control nodes, a current level passing between the controlled delay means current control port and the activated one of the delay control nodes, the controlled delay means being for generating a delay having a duration responsive to the current level; and



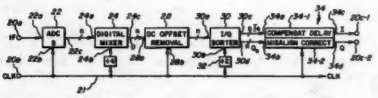
node activation means (228, 224) coupled to the delay control nodes for activating one of the delay control nodes in response to the state of the delay section signal.

4,878,029

COMPLEX DIGITAL SAMPLING CONVERTER FOR DEMODULATOR

Gary J. Saulnier, Rexford, N.Y.; Randy G. Herrera, Pasadena, Calif., and Timothy E. Thiel, Troy, N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed Dec. 5, 1988, Ser. No. 280,073
Int. Cl.[4] H03D 3/00
U.S. Cl. 329—341 19 Claims



1. A complex digital sampling converter, for providing substantially simultaneous output streams of in-phase I data and quadrature-phase Q data words to a digital detector means of a digital demodulator receiving an analog IF signal, comprising:

ADC means for converting the analog IF signal, having a carrier frequency F_c, to a stream of digital data samples taken at a sampling frequency F_s substantially equal to $4F_c$;

digital mixer means for converting the digital data sample stream to a stream of baseband digital data words;

sorter means for separating interleaved alternating ones of the baseband data word stream into sequential sorted pairs of an in-phase I_s data word and a quadrature-phase Q_s data word; and

means for compensating the sorted pairs of data words for any quadrature misalignment effects, to provide the output data streams.

4,878,030

LINEARIZER FOR MICROWAVE AMPLIFIER

Arpad D. Vincze, Los Altos, Calif., assignor to Ford Aerospace & Communications Corporation, Newport Beach, Calif.

Filed Oct. 23, 1987, Ser. No. 112,852
Int. Cl.[4] H03F 1/30, 3/58
U.S. Cl. 330—149 6 Claims

1. An apparatus for compensating for distortions in the transfer characteristics of a travelling wave tube amplifier comprising:

a first channel;

a second channel;

a third channel;

signal divider means coupled to provide a microwave signal divided phase synchronously into a first channel microwave signal to said first channel, a second channel microwave signal to said second channel and a third channel microwave signal to said third channel;

non-linear diode means in said first channel for limiting said first channel microwave signal;

first attenuation means in said second channel for attenuating said second channel microwave signal by a first adjustable constant;

second attenuation means in said third channel for attenuating said third channel microwave signal by a second adjustable constant;

first hybrid means coupled to said first channel and to said second channel for combining said first channel microwave signal and said second channel microwave signal in a 180° phase relationship to provide a differential signal on a differential signal channel; and

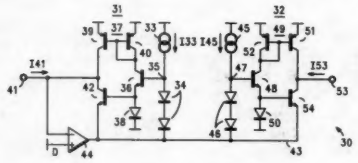
second hybrid means coupled to said third channel and to said differential channel for combining said differential channel signal and said third channel microwave signal in quadrature phase, thereby to allow for substantially independent adjustment of AM/AM characteristics and AM/PM characteristics of a resultant output signal.

4,878,031

CLASS B VARIABLE GAIN CONTROL CIRCUIT

W. Eric Main, Mesa, Ariz., assignor to Motorola, Inc., Schaumburg, Ill.

Filed Mar. 6, 1989, Ser. No. 319,038
Int. Cl.[4] H03G *3/00*
U.S. Cl. 330—254 **18 Claims**



1. A gain control circuit having an input and an output, comprising:

a bias source for providing first and second bias signals;

reference means receiving said first and second bias signals for providing first and second reference voltages;

circuit means coupled to the input of the circuit responsive to an applied input signal for providing a dynamic control voltage at an output;

an input stage including circuit means responsive to said input signal and said dynamic control voltage for permitting the absolute magnitude of said input signal to exceed the magnitude of said first bias signal, said input stage coupled between said input and said reference means and being biased by said first reference voltage; and

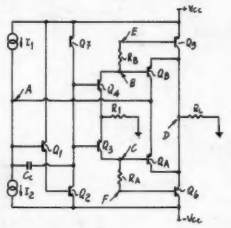
an output stage including circuit means responsive to said dynamic control voltage for providing an output signal at the output of the circuit the absolute magnitude of which may exceed the magnitude of said second bias signal, said output stage being coupled between said output and said reference means and being biased by said second reference voltage wherein the ratio of said output and input signals is proportional to the ratio of said second and first bias signals.

4,878,032

AMPLIFIER STAGE WITH COLLECTOR OUTPUT

Edoardo Botti, Mortara; Aldo Torazzina, Monza, and Fabrizio Stefani, Cardano al Campo, all of Italy, assignors to S-Thomson Microelectronics S.p.A., Catania, Italy

Filed Apr. 12, 1988, Ser. No. 180,743
Claims priority, application Italy, Apr. 21, 1987, 20195 A/87
Int. Cl.[4] H03F *3/26*
U.S. Cl. 330—263 **8 Claims**



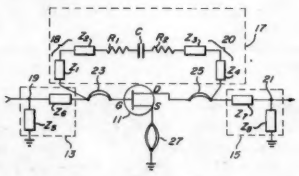
1. An amplifier stage with collector output, comprising a pair of input current sources connected in series between a pair of reference voltage lines and feeding respective input currents, a pair of output transistors, connected in series between said pair of reference voltage lines and defining an intermediate output terminal of the amplifier stage, a driving circuit comprising active elements and interposed between said input current sources and said output transistors, and a pair of control circuits each controlling saturation of a respective one of said output transistors, each of said control circuits comprising resistive means interposed between said driving circuit and said respective output transistor for presetting a balance saturation gain of said respective output transistor, and transistor means having base terminals connected to said driving circit and collector and emitter terminals connected between said respective output transistor and said input current sources, and defining a negative feedback for reducing imbalance between said input currents fed by said input current sources.

4,878,033

LOW NOISE MICROWAVE AMPLIFIER HAVING OPTIMAL STABILITY, GAIN, AND NOISE CONTROL

Joseph S. Wong, Upland, Calif., assignor to Hughes Aircraft Company, Los Angeles, Calif.

Filed Aug. 16, 1988, Ser. No. 232,728
Int. Cl.[4] H03F *3/16*
U.S. Cl. 330—277 **15 Claims**



1. An amplifier comprising:

a field effect transistor means for operating in the microwave frequency range, said transistor means having a drain and a gate; and

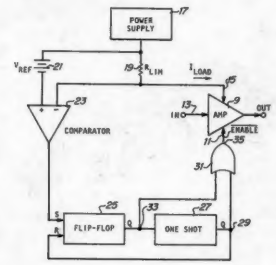
a parallel feedback network connected between the drain and gate of said transistor means and including a first resistor, a capacitor and a second resistor, the first resistor, capacitor and second resistor being connected in series, the values of the first and second resistors being selected to achieve a stability factor K greater than one for said amplifier over a multioctave range of frequencies.

4,878,034

DIGITAL PROTECTION CIRCUIT AND METHOD FOR LINEAR AMPLIFIER

William H. Gross, Sunnyvale, and James B. Cecil, Santa Clara, both of Calif., assignors to Elantec, Milpitas, Calif.

Filed Mar. 27, 1989, Ser. No. 329,377
Int. Cl.[4] H03F 1/52
U.S. Cl. 330—298 **3 Claims**



1. A circuit for controlling operation of an amplifier which receives operating current and which has a control input for disabling the amplification of an applied signal in response to a signal applied to the control input thereof, the circuit comprising: p1 resistor means connected to supply operating current to the amplifier for producing a voltage drop thereacross representative of the operating current supplied thereto;

comparator means coupled to receive said voltage drop for producing an output in response to said voltage drop exceeding a selected level;

trigger means coupled to receive the output from said comparator means for operating in response thereto in one of two logic states, said trigger means including an input for receiving an input applied thereto to activate operation thereof in another of said two logic states;

timing means operable for a selected time interval in response to a signal applied thereto, said timing means being coupled to said trigger means and producing an output indicative of operation thereof for said time interval in response to said trigger means operating in said one logic state;

means coupling the output of said timing means to said input of said trigger means to activate operation thereof in said other logic state; and

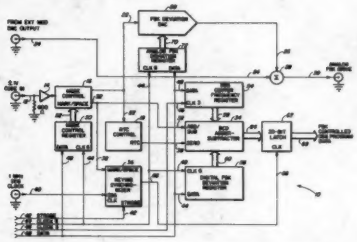
gating means coupled to said trigger means and to said timing means for producing the signal for application to the control input to disable the amplifier in response to said trigger means operating in said one logic state or said timing means operating in said timing interval.

4,878,035

HYBRID FREQUENCY SHIFT KEYING MODULATOR AND METHOD

John A. Vendely, and David M. Badger, both of Indianapolis, Ind., assignors to Wavetek RF Products, Inc., Indianapolis, Ind.

Filed May 27, 1988, Ser. No. 200,075
Int. Cl.[4] H03C 3/00
U.S. Cl. 332—101 **34 Claims**



1. A frequency synthesizer including phase-locked loop and direct digital synthesis sections for generation of a synthesized RF output signal corresponding to a digitally coded input signal wherein the improvement comprises an FSK modulator comprising:

means for modulating said phase-locked loop section in accordance with said input signal;

means for deriving an FSK offset signal from said input signal; and

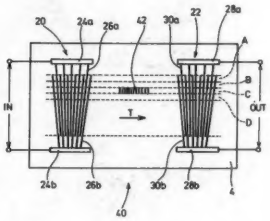
means for applying said FSK offset signal to said direct digital synthesis section.

4,878,036

SURFACE ELASTIC WAVE FILTER

Hiromi Yatsuda; Yoshihiko Takeuchi; Toichi Kohda, and Shokichiro Yoshikawa, all of Mitaka, Japan, assignors to Nihon Musen Kabushiki Kaisha, Tokyo, Japan

Filed Jul. 15, 1987, Ser. No. 73,976
Claims priority, application Japan, Jul. 16, 1986, 61-167460; Jul. 30, 1986, 61-180798
Int. Cl.[4] H03H 3/64
U.S. Cl. 333—195 **10 Claims**



1. A surface elastic wave filter comprising:

a piezoelectric body having a surface;

a pair of electrodes disposed on said surface for sending and receiving a surface elastic wave between said electrodes to pick up a signal of prescribed frequency bandwidth characteristics, at least one of said electrodes comprising a plurality of splayed electrode fingers; and

a structure disposed on said surface between said electrodes for scattering and reflecting surface elastic waves having prescribed frequencies within said bandwidth.

4,878,037

FLANGE CONNECTION USING A RADIALLY ELASTIC CENTERING RING

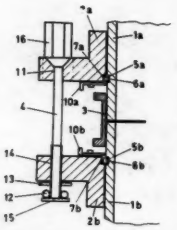
Hans-Günter Mathews, Oberehrendingen, and Oskar Schafheitle, Oetwil a.d.L., both of Switzerland, assignors to BBC Brown Boveri AG, Baden, Switzerland

Filed Aug. 19, 1988, Ser. No. 233,826

Claims priority, application Fed. Rep. of Germany, Aug. 20, 1987, 3727797

Int. Cl.[4] H01P *1/04*

U.S. Cl. 333—254 **15 Claims**



1. A flange connection for connecting a first and a second waveguide, comprising:

a first and second independent flange ring, which are attached to one end of the first and the second waveguides for joining said first and second waveguides, respectively;

a radially elastic centering ring enclosing each of said one ends of the waveguides, so as to produce coaxiality of the two waveguides;

wherein:

said centering ring is provided with slots which extend parallel with respect of the axis of the centering ring and which alternatively penetrate from a first and a second edge of said centering ring, so as to achieve a radial spring effect.

4,878,038

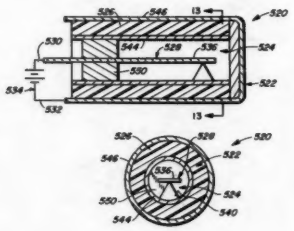
CIRCUIT PROTECTION DEVICE

James T. Tsai, 5109 Glenbrook Dr., Vienna, W. Va. 26105

Filed Dec. 7, 1987, Ser. No. 129,651

Int. Cl.[4] H01H *61/02, 71/16;* H02H *5/04*

U.S. Cl. 337—107 **21 Claims**



1. A device suitable for arrangement in a circuit for protection of components in the circuit, comprising

a temperature responsive electrical regulating means including a conductive polymer means or ceramic means having an electrical regulating capability dependent on temperature,

first switch means arranged in series with the temperature responsive electrical regulating means, the switch means including trip means for opening the circuit and positively terminating current flow in a reliable manner, and

means for connecting the temperature responsive electrical regulating means and first switch means in the circuit,

the trip means of the first switch means comprising and elongated member responsive to temperature for opening the circuit, the conductive polymer or ceramic means of the temperature responsive electrical regulating means being of cylindrical configuration and surrounding the elongated member in spaced apart relation therefrom in order to assure rapid response of the circuit protection device.

4,878,039

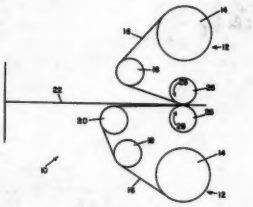
APPARATUS AND METHOD FOR PROVIDING A STRAIN-RESISTANT RESISTANCE TEMPERATURE DETECTOR

Carolyn Kraemer, Georgetown, Tex., assignor to Weed Instruments Co., Inc., Round Rock, Tex.

Filed Nov. 2, 1987, Ser. No. 115,347

Int. Cl.[4] H01C *3/04*

U.S. Cl. 338—26 **8 Claims**



1. An electrical resistance temperature element for use in a temperature averaging sensor comprising a length of wire with a known electrical resistance versus temperature characteristic wound on a first flexible, non-elastic substrate and further encapsulated by a second flexible non-elastic substrate.

4,878,040

VARIABLE RESISTOR

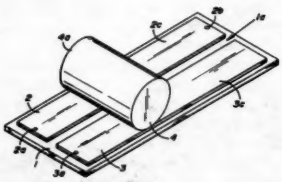
Shigeki Tamura, Tanashi, Japan, assignor to Fostex Corporation of Japan, Tokyo, Japan

Filed Feb. 24, 1988, Ser. No. 159,831

Claims priority, application Japan, Feb. 25, 1987, 62-27863

Int. Cl.[4] H01C *10/28*

U.S. Cl. 338—158 **18 Claims**



1. A method for varying electrical resistance, comprising the steps of:

providing an insulator base plate;

placing a strip-shaped conductive element on the base plate such that said conductive element extends along a longitudinal length of said base plate;

a strip-shaped support means for supporting the conductive element and the resistive element, said support means extending along a longitudinal length of said resistive and conductive elements;

a contact means for conductivity contacting the conductive element with the resistive element, the contact means,

upon activation, remaining in rolling contact with the conductive element and the resistive element while eliminating substantially all sliding contact;

a bracket that surrounds said contact means; and

pressure means for applying a biasing pressure on the contact means, said pressure means fixed between and on said bracket and a shaft of said contact means.

7. An improved variable, electrical resistor, comprising:

a strip-shaped conductive element;

a strip-shaped resistive element;

4,878,041

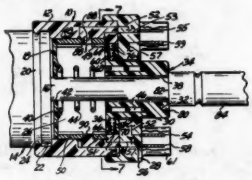
HYDRAULIC MASTER CYLINDER SWITCH

Keith V. Leigh-Monstevens, Troy, and Richard A. Nix, Utica, both of Mich., assignors to Automotive Products plc, Warwickshire, England

Continuation of Ser. No. 80,196, Jul. 29, 1987, abandoned, which is a continuation of Ser. No. 590,168, Mar. 16, 1984, abandoned. This application Dec. 2, 1988, Ser. No. 279,332

Int. Cl.[4] B60Q *1/26*

U.S. Cl. 340—479 **19 Claims**



1. A hydraulic master cylinder assembly for a control system of a motor vehicle, said assembly comprising:

(A) a master cylinder filled with hydraulic fluid;

(B) a piston mounted within said master cylinder;

(C) a rigid input rod including a first end portion projecting into one end of said master cylinder for connection to said piston, a second end portion including means for connection to a control device for the motor vehicle control system, and an elongated central portion rigidly secured to said first and second end portions and extending outside of said master cylinder between said end portions, said input rod being moved axially in response to operator actuation of the control device to move said piston axially in said cylinder and eject hydraulic fluid under pressure form said cylinder;

(D) a hollow switch housing mounted proximate said central input rod portion and extending axially along said rod portion from a first housing end proximate said one end of said master cylinder to a second housing end remote from said one end of said master cylinder;

(E) a plunger mounted within the hollow of said housing and movable reciprocally within said housing hollow between a location proximate said first end of said housing to a location proximate said second end of said sousing;

(F) a spring within said housing hollow urging said plunger toward one of said first and second ends of said housing;

(G) a series of axially spaced electrical contacts mounte.. in axially spaced location along an internal surface of the hollow of said housing in juxtaposition to the reciprocal path of said plunger within said housing hollow;

(H) means operative in response to axial movement of said input rod in response to operator actuation of the control device to move said plunger axially within said housing hollow against the resistance of said spring into successive juxtaposition with said series of electrical contacts; and

(I) means on said plunger operative to successively coact with each of said series of electrical contacts upon successive movement of said plunger into juxtaposition with said contracts to successively make or break vehicular electrical control circuits respectively controlled by said contacts.

4,878,042

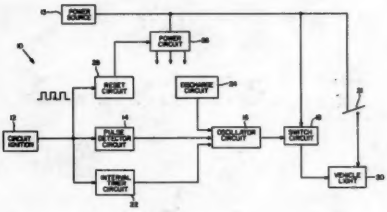
APPARATUS FOR FLASHING VEHICLE LIGHTS TO WARN OF ENGINE STALL

J. Michael Eggiman, 20705 S. Sprague Rd., Redland, Oreg. 97045, and Vance A. Dunlop, Troutdale, Oreg., assignors to J. Michael Eggiman, Portland, Oreg.

Filed Jun. 14, 1988, Ser. No. 206,351

Int. Cl.[4] B60Q *1/00*

U.S. Cl. 340—439 **16 Claims**



1. Apparatus for flashing a vehicle light to warn of an engine stall of a vehicle, the vehicle employing an ignition circuit for generating ignition pulses while the engine is running and a power source for powering the vehicle light, comprising:

detecting means for detecting an absence of the ignition pulses while the ignition circuit is switched on;

signal generating means responsive to the detecting means for generating a flashing signal upon signalling by the detecting means of a lack of ignition pulses; and

switch means coupled between the power source and the vehicle light and responsive to the flashing signal for alternately connecting and disconnecting the power source to the light to flash the light.

4,878,043

DEVICE FOR INDICATING HYDROCULTURE-RELATED VALUES

Guy Heusquin, and Anke Heusquin, both of 19 Rodgy Thier, B-4500 Liège-Jupille, Belgium

Filed Nov. 16, 1987, Ser. No. 120,974

Claims priority, application Fed. Rep. of Germany, Nov. 20, 1986, 3639695

Int. Cl.[4] G08B *19/00, 21/00*

U.S. Cl. 340—521 **16 Claims**

1. A device for indicating values which are of interest in hydroculture applications comprising:

a tube open at one end thereof and attached to a vessel at another end thereof;

probe means, comprising at least one sensor and disposed proximate said tube one end, for responding to a liquid;

an IC connected to said sensor and comprising an electronic system;

strip means for supporting said probe means and said electronic system; and

means for removably mounting said strip means, within said tube and vessel in order to facilitate removal of said probe

and electronic system for maintenance while said tube and vessel remain insitu in a hydroculture medium

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4,878,044

GLAZING UNIT ALARM SYSTEM

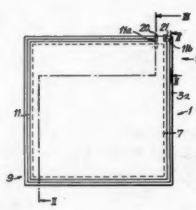
James A. A. Hickman, 14a Seaforth Drive, Edinburgh, Scotland

Filed Feb. 19, 1988, Ser. No. 163,509

Claims priority, application United Kingdom, Feb. 19, 1987, 8703887

Int. Cl.[4] G08B *13/00*

U.S. Cl. 340—550 **12 Claims**



1. A glazing unit alarm system comprising a glazing unit incorporating at least one glazing panel having spaced apart first and second faces, and electric alarm means responsive to a change in resistance, comprising a series connection of a light transmitting electrically conductive coating extending across a major part of the area of said first face of said at least one glazing panel, an electrically conducting strip applied to said second face, an electrically conductive web for connecting one end portion of said strip to said conductive coating, and electrical conductor means for connecting respectively, the other end portion of said strip and said conductive coating to said electric alarm means.

4,878,045

LOCKING CABLE FOR ANTITHEFT DEVICES

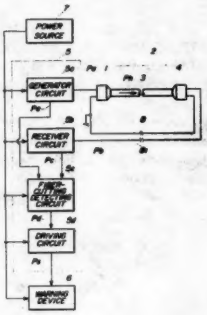
Tetsuo Yamagata, Tokyo, Japan, assignor to Honda Giken Kogyo K.K., Tokyo and Kabushiki Kaisha Honda Rokku, Miyazaki-ken, both of, Japan

Filed Dec. 26, 1985, Ser. No. 813,390

Claims priority, application Japan, Dec. 27, 1984, 59-273587; Dec. 27, 1984, 59-273588; Dec. 27, 1984, 59-196276[U]

Int. Cl.[4] G08B *29/00*

U.S. Cl. 340—556 **8 Claims**



1. An antitheft device including a locking cable, an optical fiber longitudinally extending through said locking cable, a pair of photoelectric elements arranged at opposite ends of said optical fiber, and warning means responsive to a change in an electrical signal generated by one of said photoelectric elements and corresponding to a change in a photo signal generated by the other of said photoelectric elements and transmitted through said optical fiber, said locking cable comprising:

a longitudinally extending core portion including said optical fiber disposed along an axis thereof;

a longitudinally extending first reinforcing layer concentrically disposed around said core portion and including a plurality of first reinforcing members;

a longitudinally extending second reinforcing layer concentrically disposed around said first reinforcing layer and including two electric conductors and a plurality of second reinforcing members, each of said electric conductors comprising a single wire, each of said second reinforcing members comprising a plurality of strands each formed of a plurality of twisted steel wires, said electric conductors being arranged diametrically symmetrical to each other with respect to said core portion, said electric conductors and said second reinforcing members being of substantially the same diameter and at substantially the same radial distance from an axis of said locking cable, and said electric signal being transmitted exclusively through said electric conductors; and

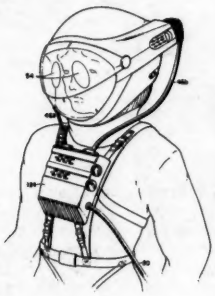
an outermost layer formed solely by a flexible hollow protective member disposed around said longitudinally extending second reinforcing layer, said flexible hollow protective member having an inner peripheral surface and covering said electric conductors and said second reinforcing members in a manner such that said electric conductors and said second reinforcing members are disposed in contact with said inner peripheral surface of said flexible hollow protective member, said first reinforcing members being wound around said core portion in a manner extending parallel with each other, and said electric conductors and said second reinforcing members being wound around said first concentric portion in a manner longitudinally extending parallel with each other.

4,878,046

MOUNTING A CATHODE RAY TUBE FOR A HEADS-UP DISPLAY SYSTEM

Stephen J. Smith, Simsbury, Conn., assignor to United Technologies Corporation, Hartford, Conn.

Filed Jul. 30, 1987, Ser. No. 79,553
Int. Cl.[4] G02D *27/14*
U.S. Cl. 340—705 **3 Claims**



1. A helmet mounted display system for displaying, to the wearer of the helmet, electronically generated images in superposition with a view of the environment, comprising:

a helmet;

a pack adapted to be worn on the torso of the wearer of said helmet;

a cathode ray tube disposed in said pack;

a signal conditioning circuit means disposed in said pack for providing, in response to image related signals received thereat, image generation controlling signals to said cathode ray tube;

a high voltage supply means disposed in said pack for providing a high voltage signal to said cathode ray tube and for providing operating voltage to said signal conditioning circuit means;

connection means disposed on said pack for connecting said signal conditioning circuit means for response to image related signals provided externally of said pack and for connecting a voltage source external of said pack to said high voltage supply means;

optical fiber means extending between said pack and said helmet for conducting images presented on said cathode ray tube to said helmet; and

a superposing display optics system disposed in said helmet in a manner to permit viewing of the environment therethrough by the wearer thereof and disposed with respect to said optical fiber means so as to superpose images presented by said cathode ray tube on the wearer's view of the environment.

4,878,047

STRUCTURE OF MULTIPLEX-TYPE LIQUID CRYSTAL IMAGE DISPLAY APPARATUS, AND CONTROL CIRCUIT THEREFOR

Takahiro Fuse, and Koji Yamagishi, both of Tokyo, Japan, assignors to Casio Computer Co., Ltd., Tokyo, Japan

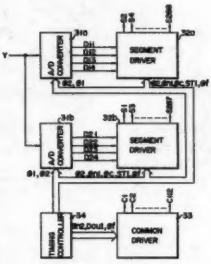
Filed Oct. 16, 1987, Ser. No. 111,686
Claims priority, application Japan, Oct. 21, 1986, 61-160049[U]; Oct. 24, 1986, 61-163256[U]
Int. Cl.[4] G09G *3/36*
U.S. Cl. 340—784 **27 Claims**

1. An image display apparatus, comprising:

a liquid crystal display panel having segment electrodes and common electrodes, wherein odd-numbered segment electrodes are extracted from one side and different, even-numbered segment electrodes are extracted from a different side of the display panel, each common electrode defining a different scanning line on which the odd-numbered and the even-numbered segment electrodes are alternately arranged to form a corresponding number (n) of pixels when a common electrode is selectively driven a certain time period (T) and the segment electrodes are driven during said time period;

a first A/D converter for converting a luminance signal, to be displayed on said liquid crystal display panel, into digital data at a certain phase timing;

a second A/D converter for converting the luminance signal into digital data at a timing having a phase different from that of said first A/D converter;



a first segment driver for driving the odd segment electrodes of said liquid crystal display panel, in accordance with an output signal from said first A/D converter;

a second segment driver for driving the even segment electrodes, in accordance with an output signal from said second A/D converter; and

a common driver for sequentially driving the common electrodes of said liquid crystal display panel;

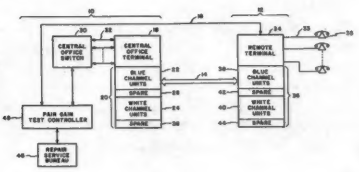
wherein said first and second A/D converters each include means for operating at a sampling frequency (f_s) substantially equal to one-half (n/T).

4,878,048

CHANNEL REDUNDANCY IN A DIGITAL LOOP CARRIER SYSTEM

Jeffrey L. Gottesman, Morris Plains, N.J.; Mark A. Dempsky, Glendale Heights, Ill.; Donald E. Koch, Aurora, Ill., and Dev R. Rattan, Chicago, Ill., assignors to Rockwell International Corporation, El Segundo, Calif.

Filed Aug. 10, 1988, Ser. No. 230,641
Int. Cl.[4] H04K *1/00*
U.S. Cl. 340—825.010 **18 Claims**



1. A channel redundancy system for use with a central office connected to a remote location comprising:

a central office terminal at the central office having a plurality of channel units including at least one spare channel unit;

a remote terminal at the remote location having a plurality of channel units including at least one spare channel unit, said channel units in said remote terminal associated cor-

respondingly with said channel units in said central office terminal;

means for providing transmission lines for connecting said channel units of said central office terminal to said channel units of said remote terminal;

means for identifying a defective one of said channel units in one of said remote terminal and in said central office terminal; and

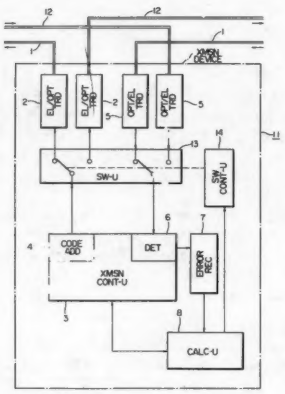
means for automatically exchanging said identified defective channel unit with said spare channel unit in said one of said remote terminal and said central office terminal.

4,878,049

INFORMATION TRANSMISSION SYSTEM FOR RAILWAY VEHICLES

Hajime Ochiai, Nishinomiya, and Kenji Morihara, Takarazuka, both of Japan, assignors to Mitsubishi Denki Kabushiki Kaisha

Filed Mar. 26, 1985, Ser. No. 716,254
Claims priority, application Japan, Mar. 27, 1984, 59-61380
Int. Cl.[4] G05B *23/02*
U.S. Cl. 371—5.5 **2 Claims**



1. In an information transmission system wherein information is transmitted optically between cars of a train, a transmission device comprising:

means for transmitting information including data and an error code over a transmission line, said transmitting means including means for adding in succession to the data an error code corresponding to the data to provide the information for transmission,

means for receiving information including data and an error code from the transmission line, said receiving means being coupled to the transmitting means and including means for checking the received data against the received error code to detect a transmission error,

means for determining an error rate at which the transmission error occurs,

means for providing a predetermined signal when the error rate exceeds a predetermined value representing imminent decisive loss of function of the transmission line and for transmitting and receiving over another transmission line responsive to the signal, whereby loss of communication is prevented responsive to the predetermined signal, and

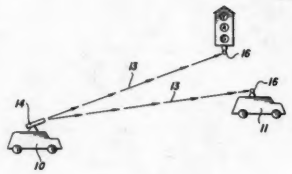
display means responsive to the predetermined signal for indicating the excess of the error rate over the predetermined value.

4,878,050

MOTOR VEHICLE REMOTE CONTROL SYSTEM

William L. Kelley, 4633 SW. 31st Dr., Hollywood, Fla. 33023

Filed Mar. 6, 1987, Ser. No. 22,724
Int. Cl.[4] H04Q *9/00*
U.S. Cl. 340—825.060 **1 Claim**



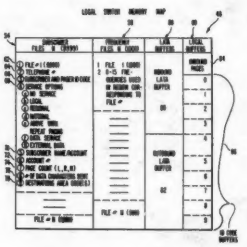
1. Motor vehicle remote control system for enabling an authorized vehicle to control the movements of at least one general vehicle having drive control elements, comprising: a signal beam transmitter disposed on top of the authorized vehicle; means for directing said signal beam; a signal receiver attached to said general vehicle for receiving said signal beam; vehicle control means disposed in said general vehicle being responsive to said signal receiver, connected to said general vehicle's drive control elements for controlling the movements of said general vehicle; wherein said signal beam contains energy from one of: electromagnetic wave energy, and acoustic energy; said movements of the general vehicle is at least one of: decelerating the general vehicle, stopping the general vehicle, and stopping the general vehicle after a delay; including a transmission disengage element for disengaging the engine from the general vehicle's drive wheels; including a fuel disengage element and wherein said transmission disengage element is disposed in a housing structurally connected to the engine cooling system and being traversed by cooling liquid, for preventing unauthorized tampering with at least one of the transmission and the fuel disengage element.

4,878,051

PAGING SYSTEM WITH COMMANDS FOR CHANGING FUNCTIONALITY OF A PAGING RECEIVER

Andrew A. Andros, Spring, Tex.; Thomas J. Campana, Jr., Chicago, Ill.; Gary F. Thelen, Palos Park, Ill., and Robert A. Kinast, Chicago, Ill., assignors to Telefind Corp., Coral Gables, Fla.

Filed Feb. 22, 1988, Ser. No. 158,982
Int. Cl.[4] H04Q *7/00*
U.S. Cl. 340—825.440 **44 Claims**



44. A paging system comprising:

(a) a transmitter, coupled to a local paging system, for transmitting pages which are each comprised of an identification number having multiple digits which identify a paging receiver to receive a page, and a plurality of charac-

ters with the page modulating a radio common carrier which is broadcast by the transmitter;

(b) means for receiving pages to be broadcast by the transmitter;

(c) a memory, coupled to the means for receiving, for storing the received pages to be broadcast;

(d) a plurality of subscriber files, each subscriber file having a plurality of fields of information which are stored for each subscriber of the paging system including an identification number which uniquely identifies a subscriber and which uniquely identifies the paging receiver to receive pages charged to the subscriber and a service option field specifying different levels of service to be provided to the subscriber including local service;

(e) a sublocal paging means, for broadcasting pages on a non-common carrier, coupled to the local paging system, for providing pages to the local system which are to be transmitted by the transmitter; and

(f) control means, coupled to the storage means and the subscriber files, for processing each received page to determine if the identification number of the page received from the sublocal switch matches an identification number stored in the subscriber files and if a match is present and if local service has been coded causing the page received from the sublocal system to be broadcast by the transmitter to a paging receiver identified by the identification number in the page.

4,878,052

HAND-HELD TRANSMITTER FOR THE EMISSION OF CODED ELECTROMAGNETIC PULSES, AND A RECEIVER FOR RECEIVING PULSES EMITTED BY THE TRANSMITTER

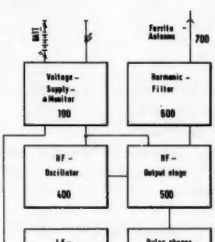
Matthias Schulze, Weiterstadt, Fed. Rep. of Germany, assignor to Alltronik Gesellschaft Fur Elektronische Steuerung und Antriebe mbH, Weiterstadt, Fed. Rep. of Germany

Filed Feb. 5, 1988, Ser. No. 152,883

Claims priority, application Fed. Rep. of Germany, Dec. 5, 1987, 3741324

Int. Cl.[4] H04B *1/02*

U.S. Cl. 340—825.690 **24 Claims**



1. A hand-held transmitter for emitting coded electromagnetic pulses for reception and processing by a receiver tuned to said transmitter, preferably for the remote operation of garage doors, said transmitter comprising:

(a) a current/voltage supply having output means;

(b) a coded pulse generating coding unit with an adjustable code coupled to said output means of said current/voltage supply and having an output;

(c) a pulse shaper having an output and coupled to said output of said coding unit;

(d) an HF oscillator having an output and coupled to said current/voltage supply output means;

(e) an HF output stage having an output and coupled to said pulse shaper output and to said oscillator output;

(f) an antenna; and

(g) a filter coupled between said HF output stage and said antenna;

wherein said HF oscillator comprises a circuit which enables a reliable oscillation build-up pattern in a relatively wide range of frequencies around a rated frequency, and said filter is a steeply-flanked low-pass filter.

4,878,053

ACTUATION METHOD

Louis H. Rorden, Los Altos, and T. Charles Moore, Sunnyvale, both of Calif., assignors to Develco, Inc., San Jose, Calif.

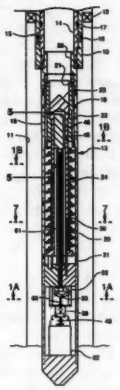
Division of Ser. No. 730,397, May 3, 1985, Pat. No. 4,736,791.

This application Apr. 14, 1988, Ser. No. 181,678

The portion of the term of this patent subsequent to Oct. 21, 2003, has been disclaimed.

Int. Cl.[4] G01V *1/40*

U.S. Cl. 340—853 **9 Claims**



1. In a method of controlling operation from a remote control location of a device located downhole in a well, the steps comprising:

A. Providing a self-contained source of power at the downhole location of said device;

B. Generating a signal at the remote control location indicating the time the device is to operate downhole in a selected operating state;

C. Transmitting the generated signal from said remote control location toward the downhole location of said device;

D. Receiving a signal at said downhole location during all of the time said device is to operate is said selected state, said signal causing said operation;

E. Directing operation of said device in said selected state during said time, while as said source of power is capable of maintaining a power output greater than a predetermined threshold level; and

F. Using a latch to disconnect said device from said power source when a state of said source indicates that said source will not be capable of maintaining a power output greater than a predetermined threshold level.

4,878,054

METHOD AND DEVICE FOR REPRESENTING THE HORIZON ON BOARD AN AIRCRAFT

Jean M. Reynaud, Pertuis, France, assignor to Avions Marcel Dassault - Breguet Aviation, Vaucresson, France

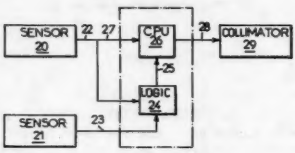
PCT No. PCT/FR86/00130, § 371 Date Dec. 18, 1986, § 102(e) Date Dec. 18, 1986, PCT Pub. No. WO86/06160, PCT Pub. Date Oct. 23, 1986

PCT Filed Apr. 18, 1986, Ser. No. 9,363

Claims priority, application France, Apr. 18, 1985, 85 05854

Int. Cl.[4] G01C *23/00*

U.S. Cl. 340—975 **12 Claims**



1. A method for representing the horizon on board an aircraft, comprising providing a collimator having a cathode ray tube, displaying an image on said cathode ray tube of said collimator comprising a circle of such a diameter as capable of being seen by a pilot under an angle which is between 10 and 30 milliradians, said circle including a horizon line which is inclined to the horizontal by an angle equal but opposite to the roll angle of the aircraft, which is distant from the center of the circle by a distance that depends on the pitch angle, towards the top when the aircraft is nose down and towards the bottom when it is in the process of nosing up, and which delimits two areas of different luminosities, and said circle further including a point representing a pole which is situated on the median line of the horizon line at a constant distance from said horizon line, said distance being such that upon aircraft movement during flight, when the horizon line divides said circle into two equal halves, said point is absent from the circle, and that, when the horizon line leaves the circle, said point is located on the center of said circle.

4,878,055

REMOTE CONTROL DEVICE

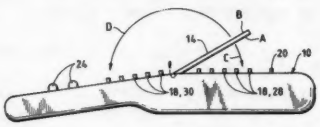
Yoshiki Kasahara, Hamamatsu, Japan, assignor to Yamaha Corporation, Hamamatsu, Japan

Filed Jun. 22, 1988, Ser. No. 210,080

Claims priority, application Japan, Jun. 22, 1987, 62-9466

Int. Cl.[4] H03M *11/00*

U.S. Cl. 341—23 **8 Claims**



1. A wireless remote control device so adapted as to permit changing remote control functions allocated to operation keys, comprising:

a body having a wireless transmitter for transmitting at least one of audio and video control signals;

an operation panel on the body equipped with a plural number of operation keys;

a function switching means for changing the functions of said operation keys;

at least one movable panel arranged pivotably to cover said operation panel, so composed as to permit operating said operation keys from an upper side of said movable panel and having markings imprinted on the surface thereof to indicate the functions of said operation keys; and

a switching operation means capable of switching said function switching means to the function mode displayed on said movable panel in conjunction with rotation of said movable panel.

4,878,056

KEY INPUT CIRCUIT

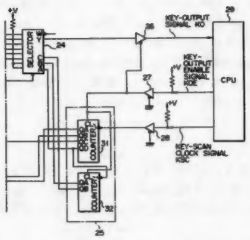
Noriyuki Isoda, and Yuji Okamoto, both of Sagamihara, Japan, assignors to Topre Corporation, Tokyo, Japan

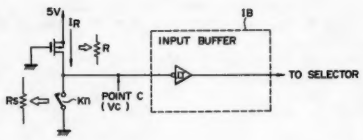
Filed Aug. 12, 1987, Ser. No. 84,191

Claims priority, application Japan, Oct. 29, 1986, 61-255780

Int. Cl.[4] G06F *3/00*

U.S. Cl. 341—26 **17 Claims**





1. A key input circuit for use in a keyboard, comprising:

a plurality of key switches;

a plurality of signal-output means connected to said key switches, for outputting electrical signals when said key switches are turned on, each of said signal-output means including resistor means connected to a corresponding key switch and a power supply, and input buffer means coupled to a connection point of said resistor means and said key switch, a resistance of said resistor means increasing in correspondence with increments of a contact resistance of said key switch;

counter means for receiving and counting clock signals supplied at predetermined intervals;

scanning means for receiving output data from said counter means and scanning said signal-output means in accordance with output data of said counter means, thereby to output said electrical signals;

determining means for generating said clock signals, receiving the electrical signal from said scanning means, and determining which key switch has been turned on, in accordance with how many clock signals has been generated before the electrical signal is received; and

reset means for resetting said counter means at a desired time.

4,878,057

TYPEWRITER KEYBOARD

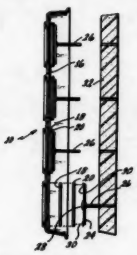
Harry W. Kompanek, Santa Barbara, and Rickey H. Ming, Ventura, both of Calif., assignors to KDC Corporation, Carpinteria, Calif.

Continuation of Ser. No. 417,524, Sep. 13, 1982, abandoned. This application Feb. 13, 1987, Ser. No. 14,461

The portion of the term of this patent subsequent to Apr. 12, 2005, has been disclaimed.

Int. Cl.[4] G06F *3/02*; H03M *11/00*

U.S. Cl. 341—34 **51 Claims**



1. In combination,

a housing constructed of a depressible material to define individual areas for depression to identify individual indicia,

a hard electrically insulating material adhered to the housing at the individual areas of the housing and depressible to transmit strains produced in the housing by the depression of housing at the individual areas in the housing,

a plurality of thin sheets of an electrically insulating material each attached to the hard insulating material at positions corresponding to the individual areas in the housing and depressible to transmit strains,

a plurality of thin sheets of an electrically conductive member each adhered to an individual one of the electrically insulating sheets at one of the individual areas of the housing and depressible to transmit strains, and

a plurality of crystals having first and second flat surfaces, each of the crystals having first and second flat surfaces, each of the crystals being adhered at its first flat surface to an individual one of the electrically conductive sheets at one of the individual areas of the housing and being depressible to produce an electrical signal at the second flat surface in accordance with such depression.

4,878,058

MULTI-PROTOCOL DATA CONVERSION

William M. Needles, Arlington, Tex., assignor to National Semiconductor Corporation, Santa Clara, Calif.

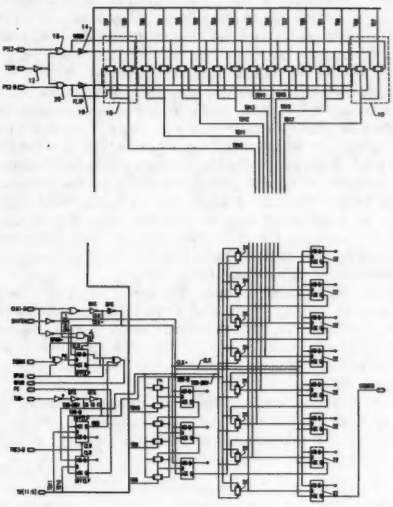
Filed Jun. 14, 1988, Ser. No. 206,504

Int. Cl.[4] H03M *1/36*

U.S. Cl. 341—101 **5 Claims**

3. Circuitry for reordering the sequence of a plurality of data bits having a first big sequence, the circuitry comprising:

(a) means comprising a plurality of two-to-one multiplexers corresponding to the plurality of data bits, each of the multiplexers receiving as inputs both a data bit from the first bit sequence and a corresponding data bit from a second bit sequence; and



(b) steering means for selecting as output data of the multiplexer means either data having the first bit sequence or data having the second bit sequence.

4,878,059

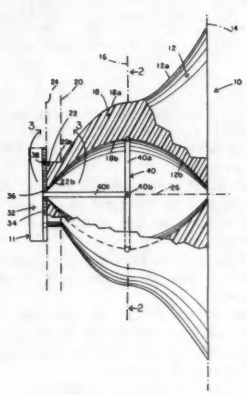
FARFIELD/NEARFIELD TRANSMISSION/RECEPTION ANTENNA

Tex Yukl, Baker, Oreg., assignor to Spatial Communications, Inc., Baker, Oreg.

Filed Aug. 19, 1983, Ser. No. 524,533

Int. Cl.[4] H01Q *19/06*

U.S. Cl. 343—753 **3 Claims**



1. A nearfield/farfield, transmission/reception antenna for electromagnetic radiation of a selected wavelength, said antenna having a transmission/reception axis, and comprising

a nearfield/farfield converter antenna portion having a body of revolution which is symmetrical with respect to said axis, and which is bounded by rear and front planes substantially normal to said axis, with inner and outer surfaces of revolution in said body extending between said planes, said inner surface, where it intersects a radial plane containing and extending to one side only of said axis, describing a curvilinear line defined by the equation $R_{ic}=A_1 \cos \theta_1$, where R_{ic} is the distance of said line from said axis, A_1 is a constant relating to the propagation velocity in air of radiation at the selected operating wavelength for the antenna, and θ_1 is the angle in degrees progressing from zero degrees away from said rear plane toward said front plane, and said outer surface, where it intersects the same radial plane, describing another curvilinear line defined by the equation $R_{oc}=A_2 \sec \theta_1$, where R_{oc} is the distance of said other line from said axis, and A_2 is a constant relating to the propagation velocities both in air, and in the material forming said body of revolution, at said selected operating frequency, said inner and outer surfaces diverging progressing toward said front plane,

a generally circular, planar, ring-like, conductive, driven expanse, having a nominal circumference substantially equaling said selected wavelength, and a nominal diameter substantially equaling $2A_1$, said expanse generally occupying said rear plane in a position symmetric with respect to said axis, and

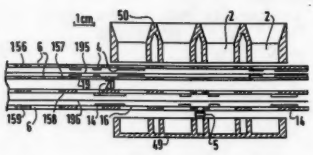
electromagnetic/electrostatic shield means distributed generally as a layer over said outer surface, impervious to radiation at said selected wavelength.

4,878,060

MICROWAVE PLANE ANTENNA WITH SUSPENDED SUBSTRATE SYSTEM OF LINES AND METHOD FOR MANUFACTURING A COMPONENT

Pascal Barbier, Saint Maurice; Francis Falgat, and Alain Sorel, both of Evreux, all of France, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Dec. 9, 1986, Ser. No. 939,583
Claims priority, application France, Dec. 20, 1985, 85 18923
Int. Cl.[4] H01Q *13/02*
U.S. Cl. 343—778 **10 Claims**



1. A planar high-frequency antenna including, in order:

a. a rigid block of material having a plurality of openings therethrough bounded by conductive surfaces defining respective waveguides;

b. a first flexible sheet having openings therethrough aligned with the openings in the rigid block and bounded by conductive surfaces defining continuations of the respective waveguides;

c. a second flexible sheet of dielectric material bearing a network of strip conductors having ends terminating in the waveguides;

d. a third flexible sheet having openings therethrough aligned with the openings in the first flexible sheet and bounded by conductive surfaces defining continuations of the respective waveguides; and

e. a rigid chassis for supporting the sheets;

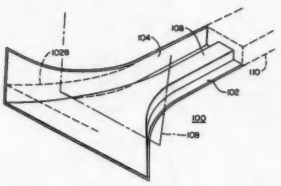
said antenna further including a first pattern of separating studs disposed between the first and second sheets, and a corresponding second pattern of separating studs disposed between the second and third sheets, said patterns of studs being deposited on respective ones of the flexible sheets and being arranged to inflexibly secure the second flexible sheet between solid portions of the rigid block and the rigid chassis.

4,878,061

BROADBAND WIDE FLARE RIDGED MICROWAVE HORN ANTENNA

Marwan E. Nussair; Michael D. Valentine, and Stephen R. Scholl, all of Cincinnati, Ohio, assignors to Valentine Research, Inc., Cincinnati, Ohio

Filed Nov. 25, 1988, Ser. No. 275,973
Int. Cl.[4] H01Q *13/02*
U.S. Cl. 343—786 **9 Claims**



1. A fast-flared rectangular horn antenna for use in a microwave detector and extending from a waveguide to an open aperture comprises:

an upwardly flared top wall;

a downwardly flared bottom wall;

outwardly flared side walls extending between said bottom wall and said top wall, the curvature and the first derivative of the curvature of the flares of said top, bottom and side walls being continuous; and

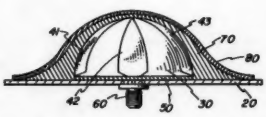
a flared and vanishing first ridge formed into said bottom wall, centered between said side walls and originating at the waveguide, the curvature and the first derivative of the curvature of the flare of said first ridge being continuous and sized such that said first ridge vanishes by melding into said bottom wall and said side walls at vanishing points within a common cross sectional plane taken along said antenna.

4,878,062

GLOBAL POSITION SATELLITE ANTENNA

Tyson S. Craven, Boca Raton, and Pushpa M. Choriyammakal, Plantation, both of Fla., assignors to Dayton-Granger, Inc., Ft. Lauderdale, Fla.

Filed Jul. 28, 1988, Ser. No. 226,018
Int. Cl.[4] H01Q *1/42, 21/26*
U.S. Cl. 343—872 **8 Claims**



1. A global position satellite receiving antenna having circular polarization and high gain near the horizon and a low standing wave ratio comprising,

a planar base member,

a hemisphere of high dielectric constant material placed on said base member,

four substantially identical antenna elements in contact with said hemisphere at substantially equal intervals, each of said elements having a base portion positioned near but insulated from said base member, and an apex portion positioned near the axis of said hemisphere,

power divider circuit means connected to said antenna elements for combining the received signals, and

means for improving the axial ratio of the received signals at low angles of radiation with respect to the plane of said base member.

4,878,063

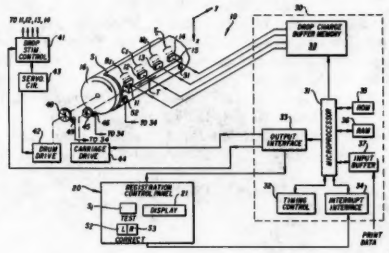
MULTICOLOR PRINTING APPARATUS AND METHOD HAVING VERNIER DETECTION/CORRECTION SYSTEM FOR ADJUSTING COLOR SEPARATION PLANES

James A. Katerberg, Kettering, Ohio, assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Dec. 5, 1988, Ser. No. 280,058

Int. Cl.[4] G01D *18/00;* **G03G** *13/01;* **H04N** *1/46*

U.S. Cl. 346—1.1 **9 Claims**



3. In apparatus for printing multicolor images of the kind having first and second color printing subsystems, a control system for detecting and correcting misregistration of the different color separation planes of those subsystems, said method comprising:

(a) means for controlling said first subsystem to print,on a test sheet, a first test array comprising of M parallel lines that are uniformly spaced along a first direction N adjustment steps apart;

(b) means for controlling said second subsystem to print, on said test sheet, a second test array comprising of M parallel lines marks that are: (i) uniformly spaced along said first direction N+1 adjustment steps apart and (ii) predeterminedly juxtaposed with respect to said first test array such that, when registration of said subsystems is correct, base registration lines of said first and second test arrays are aligned; and

(c) means for adjusting the relative position of said subsystems' printout, along said first direction, an amount based on which juxtaposed line pair of said two test array printouts are in best alignment.

4,878,064

CONTINUOUS INK JET STIMULATION ADJUSTMENT BASED ON OVERDRIVE DETECTION

James A. Katerberg, Kettering; Robert L. Wint, Trottwood, and Richard A. Lewis, Miamsburg, all of Ohio, assignors to Eastman Kodak Company, Rochester, N.Y.

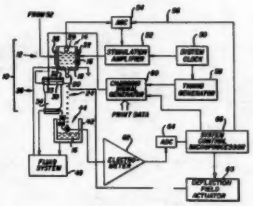
Filed Oct. 31, 1988, Ser. No. 264,738

Int. Cl.[4] G01D *18/00*

U.S. Cl. 346—75 **8 Claims**

1. In ink jet printing apparatus of the kind having orifice means for forming ink jet filaments directed toward a print zone and stimulation means for imposing energy pulses of predetermined frequency to effect drop stream formation from said jet filaments, an improved stimulation control system comprising:

(a) detecting means, including a test charge electrode located downstream from the overdrive inception point of stimulated filaments and an electrometer located to intercept charged drops, for detecting a base stimulation amplitude that produces the minimum-filament-length condition for said jet filaments; and



(b) control means, responsive to said detecting means, for adjusting said stimulation means to a nominal operating amplitude that is a predetermined fraction of said detected base stimulation amplitude.

4,878,065

THERMAL PRINTING CONTROL CIRCUIT

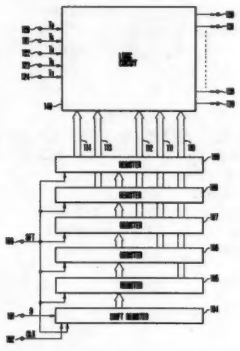
Itaru Fukushima, Tokyo; Takashi Okamoto, and Hisashi Deguchi, both of Kyoto, all of Japan, assignors to NEC Corporation, Tokyo and Susumu Corporation, Ltd., Kyoto, both of, Japan

Filed Aug. 26, 1988, Ser. No. 236,808

Claims priority, application Japan, Aug. 28, 1987, 62-214810

Int. Cl.[4] G01D *15/10*

U.S. Cl. 346—76 PH **3 Claims**



1. A thermal printing control circuit comprising:

a first serial/parallel shift register for receiving serial image data to be serially printed and for temporarily storing the serial image data;

a second parallel register group comprising a plurality of stages for storing image data corresponding to several previous print lines;

a thermal head having heating elements corresponding to bits of printing data which are to be printed and are stored in a first stage of said second register group;

a first logic gate group for calculating logic formulas t_0, t_A, t_B, t_C and t_D by using a plurality of sequentially input fundamental timing signals (T_0, T_A, T_B, T_C, T_D) for balancing heat energy of the heating elements of said thermal head in accordance with the printing data of the previous several lines stored in said second register group, and the printing data to be printed; and

a second logic gate group for calculating $T=t_O+t_A+t_B+t_C+t_D$,

the logic formulas t_O, t_A, t_B, t_C, and t_D being defined by:

$$t_O = R_{n,n} \cdot T_O$$

$$t_A = R_{n,n} \cdot (R_{n-1,n}) \cdot T_A$$

$$t_B = R_{n,n} \cdot (R_{n-2,n} \cdot R_{n-1,n-1} \cdot R_{n-1,n+1}) \cdot T_B$$

$$t_C = R_{n,n} \cdot (R_{n-2,n-1} \cdot R_{n-3,n} \cdot R_{n-2,n+1}) \cdot T_C$$

$$t_D = R_{n,n} \cdot (R_{n-2,n-2} \cdot R_{n-3,n-1} \cdot R_{n-4,n} \cdot R_{n-3,n+1} \cdot R_{n-2,n+2}) \cdot T_D$$

3. A thermal printing control circuit comprising:

a plurality of integrated circuits each of which can control N thermal print elements; and

connecting means for connecting said plurality of integrated circuits to each other;

said integrated circuit including:

a (N+M)-bit first shift register for receiving and storing a series of serial printing image data to be printed by said N thermal print elements, where M is larger than one;

a second register, constituted by a plurality of (N+M)-bit registers for storing contents of said first shift register by parallelly and sequentially shifting and receiving the contents thereof, for storing printing history data of a plurality of cycles of said N thermal print elements; and

a logic circuit for performing a logic operation by using the printing history data of the plurality of cycles of said N thermal print elements, the printing history data being stored in said second shift register, and externally supplied control timing data and for generating drive signals representing voltage waveforms to be applied to said N thermal print elements in a current cycle, wherein

said connecting means connects an input terminal of said first shift register of one of said integrated circuit to intermediate bit outputs of said first shift registers of other integrated circuits.

4,878,066

BEAM SCANNER WITH DISTORTION CORRECTION

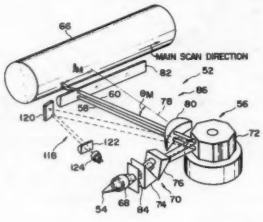
Takashi Shiraishi, Yokohama, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Sep. 16, 1988, Ser. No. 245,207

Claims priority, application Japan, Sep. 18, 1987, 62-232344

Int. Cl.[4] G01D *15/14*; H04N *1/024*

U.S. Cl. 346—108 **14 Claims**



1. An optical apparatus for an image forming apparatus for forming an image on an image carrier, comprising:

means for emitting a light beam;

means for scanning the light beam emitted by said emitting means in a first direction on said image carrier; and

correction means for correcting distortion of the light beam scanned by said scanning means, said correction means having a correction lens in which power for focusing the light beam in a second direction perpendicular to the first direction is larger than power for focusing the light beam in the first direction.

4,878,067

LASER RECORDER WITH STABLE FILM FEED AUXILIARY SCANNING

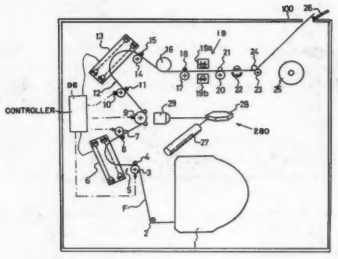
Mitsutoshi Yagoto; Akiyoshi Hamada; Masayuki Mino, all of Toyokawa; Yutaka Tanaka, Kawasaki, and Yutaka Watanabe, Tokyo, all of Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaki, Japan

Continuation of Ser. No. 41,077, Apr. 21, 1987, abandoned. This application Nov. 4, 1988, Ser. No. 267,668

Claims priority, application Japan, Apr. 22, 1986, 61-92861; Apr. 22, 1986, 6192862; Apr. 22, 1986, 61-92863; Apr. 22, 1986, 61-92864

Int. Cl.[4] G01D *9/42*

U.S. Cl. 346—108 **10 Claims**



1. A laser recorder comprising;

a housing;

a film feeding unit for feeding a film stored in a roll, disposed in said housing;

a film take-up unit disposed in said housing to form a film path extending between said film feeding unit and said film take-up unit;

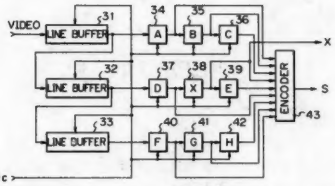
a main driving unit for driving the film for running at a fixed speed, disposed on said film path extending between said film feeding unit and said film take-up unit, said main driving unit includes a main driving roller for driving the film in contact with the outer circumference of said roller so as to draw out the film from said film feeding unit, at least two pressure rollers for pressing the film against the outer circumference of said main driving roller, a DC servomotor for driving said main driving roller, and film delivery rollers being driven at a slightly slower speed than said main driving roller, thereby functioning as resistance in contact with the film when said film is drawn out from said film feeding unit onto said film path extending between said film feeding unit, and

an image information recording unit having a laser optical system, for scanning the film by a laser beam across the width of the film being held and driven by said main driving unit.

4,878,068
BEAM RECORDER HAVING A VARYING BEAM INTENSITY FOR MAINTAINING A TRUE REPRODUCED IMAGE

Yoshiyuki Suzuki, Kawasaki, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Sep. 1, 1987, Ser. No. 91,773
Claims priority, application Japan, Sep. 8, 1986, 61-209709
Int. Cl.[4] G01D *9/42*; H04N *1/21*
U.S. Cl. 346—108 **13 Claims**



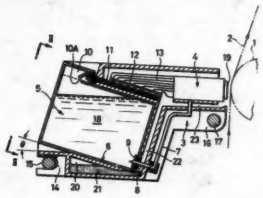
1. A beam recorder comprising:
image signal input means;
modulation means for modulating a recording beam in accordance with an image signal supplied from said input means; and
discrimination means for discriminating a characteristic of the image signal supplied from said input means,
wherein said discrimination means includes memory means for receiving the image data from said input means for each pixel and for storing data of a pixel under consideration and data of adjacent pixels, and said discrimination means discriminates whether the pixel under consideration is a pixel adjacent to a line or not in accordance with the pixel under consideration and the adjacent pixels, said discrimination means discriminating whether the pixel under consideration is adjacent to a line or not in a plurality of directions; and
wherein said modulation means controls a drive current for emitting the beam to change an intensity of the beam in accordance with a discrimination result of said discrimination means.

4,878,069
INK JET RECORDING APPARATUS WITH AN INK TANK-CARRIAGE CONFIGURATION FOR INCREASING USEABLE SPACE

Takehiko Kiyohara, Zama, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 82,946, Aug. 10, 1987, abandoned, which is a continuation of Ser. No. 752,538, Jul. 8, 1985, abandoned. This application Aug. 26, 1988, Ser. No. 237,641
Claims priority, application Japan, Jul. 9, 1984, 59-140744
Int. Cl.[4] G01D *15/16*; B41J *3/04*
U.S. Cl. 346—140 R **16 Claims**

1. An ink jet recording apparatus having a recording head carried on a carriage adapted to move along a recording material and an ink container for storing ink, said ink container having a foreside and a rearside relative to an outlet port of said ink container, ink being introduced into said recording head so as to be injected through an ink discharging orifice toward said recording material by activating an energy generator disposed on said recording head in response to a recording signal, said energy generator serving to generate energy which is utilized for the purpose of discharging ink, and said ink container being replaceably fitted into said carriage in an inclined state such that its rearside is raised above its foreside, wherein:
said ink container has a folding portion adapted to be folded

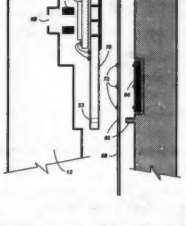


by breakage when it is fitted into said carriage, said folding portion, in a folded state, serving to establish communication between the interior of said ink container and the outside atmosphere,
said carriage is provided with a thrust portion for breaking said folding portion under the effect of a thrusting force provided by said thrust portion, said thrust portion of said carriage including a communication tube through which communication is established between the interior of the said ink container and the outside atmosphere, and
one end of said communication tube is in communication with an ink absorbing material on a bottom surface of said carriage.

4,878,070
THERMAL INK JET PRINT CARTRIDGE ASSEMBLY

Thomas E. Watrobski, Rochester, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed Oct. 17, 1988, Ser. No. 258,957
Int. Cl.[4] G01D *15/16*; B41J *3/04*
U.S. Cl. 346—140 R **8 Claims**



1. An ink jet printing device for a drop-on-demand thermal ink jet printer, the printing device including an ink supply cartridge having a printhead mounted within the cartridge, said printhead being of the type having a plurality of parallel channels, each channel being supplied with ink and having one open end which serves as an ink droplet ejecting nozzle, a

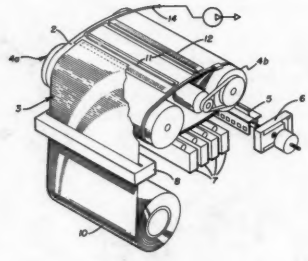
heating element being positioned in each channel a predetermined distance from the nozzle, ink droplets being ejected from the nozzles by the selective application of the current pulses to the heating elements in response to electrical signals from a remote source, the heating elements transferring thermal energy to the ink in contact therewith causing the formation and collapse of temporary vapor bubbles that expel the ink droplets, said printing device further comprising a first electrode board bonded to said printhead and mechanically connected to said cartridge, said first electrode board providing electrical connection between said heating elements and a plurality of terminals located at discrete points on both surfaces of said first board, said printing device further comprising a second electrode board in mechanical and electrical contact with said first board, said second board providing electrical connection between said first board terminals and said remote source.

4,878,071

PAPER TRANSPORT AND PAPER STABILIZING SYSTEM FOR A MULTICOLOR ELECTROSTATIC PLOTTER

Andreas Bibl, Los Altos; John Higginson, Santa Clara, and Deane Gardner, Cupertino, all of Calif., assignors to Rastergraphics, Inc., Sunnyvale, Calif.

Filed Mar. 11, 1988, Ser. No. 166,716
Int. Cl.[4] G01D *15/00*
U.S. Cl. 346—153.1 **16 Claims**



1. An improved multipass high resolution electrostatic plotter, printer or the like incorporating a transport belt means for invariant registration of a recording material with respect to a writing head comprising:

a record material;

writing means disposed for printing information on record material;

toning assembly means operatively connected with said writing means enabling said writing means to selectively apply color fluid to said record material;

transport means including a belt having an attach means for providing a vacuum to the entire surface of said record material adjacent said belt such that said record material is registered in invariant alignment with respect to said writing means and said toning assembly means;

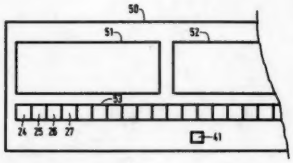
drive means for passing said transport means past said writing means and said toning assembly means.

4,878,072

LED AGE CORRECTION MEANS

Hans Reinten, Velden, Netherlands, assignor to OCE-Nederland B.V., Venlo, Netherlands

Filed Sep. 8, 1988, Ser. No. 241,941
Claims priority, application Netherlands, Sep. 11, 1987, 8702166
Int. Cl.[4] G01D *15/00*
U.S. Cl. 346—154 **6 Claims**



1. An exposure device for line and imagewise exposure of a photosensitive layer, comprising:

a. an array of LED's;

b. a control device connected to said LED array to energize each LED individually for a variable time per image line by means of an absolute correction number;

c. a memory means connected to said control device and including a first table for storing the relative intensity of each LED and an aging table for storing for each individual LED the light intensity thereof measured by said light-sensor; and

d. at least one light-sensor smaller than said array of LED's, said sensor being located a fixed distance from said LED array for measuring the relative light intensity of each individual LED connected to said control device;

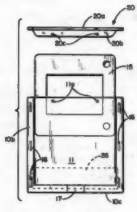
whereby said control device determines a new absolute correction number for each LED based on said data stored in said aging table and corresponding data in said first table.

4,878,073

TRANSPARENT SLIDE PROTECTIVE CONTAINER

Gary A. Hoonsbeen, Minneapolis, Minn., assignor to Image Innovations, Inc., Edina, Minn.

Filed Aug. 1, 1988, Ser. No. 226,856
Int. Cl.[4] G03B *21/64*
U.S. Cl. 353—120 **4 Claims**



1. A container for individual photographic slides, said container comprising a pair of spaced apart transparent semi-rigid plastic side panels defining an open top but positively connected along at least the side edges thereof to define a slide receiving pocket therebetween, a removable cover closing said open top with means for releasably holding the top in closed position to close the top of said pocket, said cover having a generally T-shaped cross-section with a depending tongue portion, said tongue portion being received in the open top with interfitting means formed along the upper marginal edge

of at least one of the side panels and said tongue portion to hold the top in closed position.

4,878,074

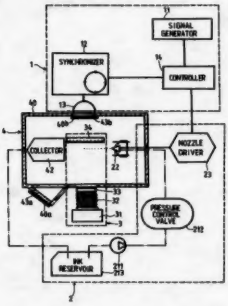
DYNAMIC PARTICULATE OBSERVATION APPARATUS

Yu-Yin Peng, Hsinchu Hsien, Taiwan, assignor to Industrial Technology Research Institute, Taiwan, Taiwan

Filed Jun. 6, 1988, Ser. No. 204,566

Int. Cl.[4] G03B 29/00; G01P 3/38, 3/40

U.S. Cl. 354—76 **7 Claims**



1. A dynamic particulate observation apparatus comprising:

a black box having an internal space enclosed therewithin, which shields said space from the infiltration of light from outside;

means for generating particles moving across said black box;

means for emitting flash light within said black box at a predetermined frequency; and

means for recording the images of the particles generated by said generating means when said emitting means emits flashlights,

said emitting means comprising:

a signal generator for generating signals at a predetermined frequency;

a controller coupled to said signal generator for receiving signals from said signal generator and generating signals at predetermined timing;

a flash synchronizer coupled to said controller for receiving signals from said controller and generating signals at a predetermined time lag of signals from said controller; and

a flash bulb coupled to said synchronizer for receiving signals from said synchronizer and emitting flashlight simultaneously.

4,878,075

CAMERA APPARATUS FOR PREVENTING DOUBLE EXPOSURE

James W. Cannon, Penfield, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Oct. 7, 1988, Ser. No. 254,907

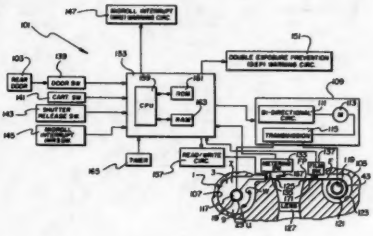
Int. Cl.[4] G03B 1/12, 17/24

U.S. Cl. 354—173.1 **3 Claims**

1. An improved photographic camera wherein a motorized film transport is operated in a prewind mode to continuously advance successive unexposed frames of a filmstrip from a light-tight cassette across a focal plane of an objective lens to a film take-up, without exposing the film frames at said focal plane, and is operated in a rewind mode to position respective unexposed frames for exposure at the focal plane and to return them individually to the cassette following each exposure, and wherein the improvement comprises:

read/write means responsive to exposure of respective film frames at said focal plane for providing corresponding film encodements along the filmstrip to indicate each film frame is exposed, and for sensing the presence or absence of a film encodement for a film frame to determine whether that particular frame is exposed; and

control means responsive to said read/write means sensing the absence of a film encodement for a film frame for allowing said film transport to continue to operate in the prewind mode, and responsive to the read/write means



sensing the presence of a film encodement for a film frame for operating the film transport in the rewind mode to return only that particular frame to the cassette, whereby when a cassette containing a filmstrip which is partially exposed is loaded in said camera said control means will operate said film transport to position the next-available unexposed frame of the filmstrip for exposure at said focal plane.

4,878,076

EXPOSURE CONTROLLING SYSTEM AND INTERCHANGEABLE LENS THEREFOR

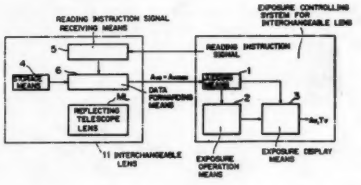
Nobuyuki Taniguchi; Toshihiko Karasaki; Hiromu Mukai; Hisashi Tokumaru, and Tokuji Ishida, all of Osaka, Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Continuation of Ser. No. 193,761, May 13, 1988. This application Mar. 20, 1989, Ser. No. 362,454

Claims priority, application Japan, May 15, 1987, 62-119200; May 19, 1987, 62-121480

Int. Cl.[4] G03B 17/17, 7/20

U.S. Cl. 354—286 **4 Claims**

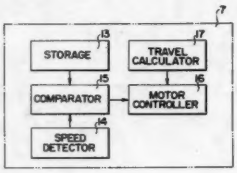


1. An exposure controlling system for an interchangeable lens, comprising a reading means for reading data regarding aperture values of said interchangeable lens from said interchangeable lens, a light measuring means, and means responsive to outputs of said reading means and said light measuring means for finding, when said interchangeable lens is an ordinary lens, a combination of an aperture value and an exposure time to which said ordinary lens can be controlled to provide an appropriate exposure and indicating the aperture value and the exposure time thereon and for finding, when said interchangeable lens is a cata-dioptric lens, and exposure time for a fixed aperture value of said cata-dioptric lens which time provides an appropriate exposure and indicating the fixed aperture value and the exposure time thereon.

4,878,077
MOTOR DRIVE AND CONTROL APPARATUS FOR A CAMERA

Hitoshi Maeno, Hachioji; Azuma Miyazawa, Mitaka, and Astushi Maruyama, Yokohama, all of Japan, assignors to Olympus Optical Company Ltd., Japan

Filed Sep. 28, 1988, Ser. No. 250,385
Claims priority, application Japan, Sep. 29, 1987, 62-244954; Feb. 9, 1988, 63-027903
Int. Cl.[4] G03B 3/00
U.S. Cl. 354—400 23 Claims



8. A motor drive and control apparatus for an automatic focus adjusting unit of a camera comprising

a motor for driving a taking lens to an in-focus position in response to an output from focus detecting means;

speed detecting means for detecting the speed of movement of the taking lens as it is driven by the motor;

storage means for storing an optimum deceleration curve used to stop the taking lens at a target position;

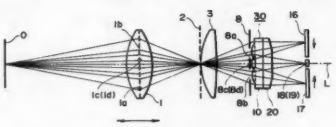
lens control means for comparing the speed of movement of the lens against the deceleration curve to control the movement of the taking lens to the in-focus position in conformity with the deceleration curve;

and motor on limit means operative adjacent to a target position in a zone adjacent to the deceleration curve to be activated by a signal from the speed detecting means while the motor is on.

4,878,078
FOCUS DETECTING DEVICE AND METHOD OF MAKING SAME

Takeshi Koyama; Keiji Ohtaka, both of Tokyo, and Yasuo Suda, Yokohama, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed May 4, 1988, Ser. No. 190,171
Claims priority, application Japan, May 14, 1987, 62-117627
Int. Cl.[4] G03B 3/00
U.S. Cl. 354—402 11 Claims



1. A device for detecting the focus adjusted state of an objective lens, comprising:

a first member having a plurality of pairs of lens portions for forming, from the image formed by the objective lens, a pair of secondary images whose relative position varies in conformity with the focus adjusted state of the objective lens;

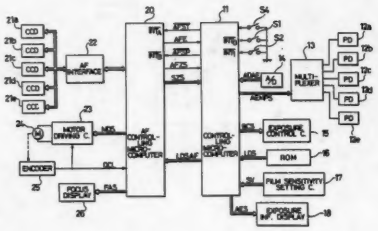
a second member rotatively adjusted relative to the first member and having first and second planar surfaces, said first planar surface differing in angle of inclination from said second planar surface; and

a plurality of sensing means for sensing a pair of light distributions corresponding to said secondary images, said sensing means having a plurality of photoelectric conversion elements.

4,878,079
FOCUS DETECTING DEVICE

Masataka Hamada, Osaka; Toshihiko Karasaki, Sakai; Toru Matsui, Sakai, and Yukio Maekawa, Sakai, all of Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Continuation of Ser. No. 85,410, Aug. 14, 1987, Pat. No. 4,768,052. This application Aug. 1, 1988, Ser. No. 226,932
Claims priority, application Japan, Aug. 18, 1986, 61-191682
Int. Cl.[4] G03B 3/00
U.S. Cl. 354—402 18 Claims



1. A focus detection device for use in a camera system including an objective lens, comprising:

means for measuring the luminance distribution of a plurality of divided areas of an objective field to be photographed to produce a plurality of luminance distribution signals in correspondence to said areas;

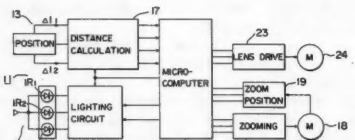
means for producing a plurality of correction data signals each relating to aberrations of the objective lens in each area; and

means for performing a focus detection calculation on the basis of the plurality of luminance distribution signals and the plurality of correction data signals to produce a resultant focus detection signal.

4,878,080
CAMERA ZOOM LENS AUTOMATIC MAGNIFICATION APPARATUS

Takamichi Takehana; Osamu Murayama; Hideaki Nakajima; Masatoshi Yamada, all of Okaya, and Makoto Hamada, Nagano, all of Japan, assignors to Chinon Kabushiki Kaisha, Japan

Filed Aug. 15, 1988, Ser. No. 232,100
Claims priority, application Japan, Mar. 14, 1988, 63-59885
Int. Cl.[4] G03B 3/10
U.S. Cl. 354—403 2 Claims



1. A camera zoom lens automatic magnification apparatus for automatically changing the focal length of a zoom lens according to a subject to be photographed comprising a zoom lens driving device for changing the focal length of the zoom lens; a range finding device which measures distances to at least three points on the subject—at the center, to the left and

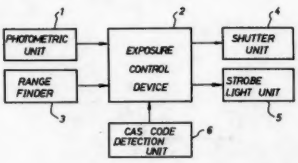
to the right—in the angle of view; and a control device which controls the zoom lens driving device according to the output of the range finding device, the control device consisting of a first decision means to decide which point is the nearest by comparing the distances to each point measured by the range finding device, a second decision means which, based on the lens focal length corresponding to the closest distance as found by the first decision means and on the depth of field for that focal length, checks if there is any other point's distance that is within the depth of field for that focal length, a third decision means which determines the zoom ratio according to a predetermined program using the result of tee second decision means, and an output means which drives the zoom lens driving device according to the third decision means.

4,878,081

EXPOSURE CONTROL DEVICE FOR A CAMERA

Daisuke Kishida, Yokohama, and Saburo Sasaki, Tokyo, both of Japan, assignors to Ricoh Company, Ltd., Tokyo, Japan

Filed Aug. 22, 1988, Ser. No. 234,528
Claims priority, application Japan, Aug. 24, 1987, 62-127444
Int. Cl.[4] G03B *7/16, 15/05*
U.S. Cl. 354—414 **5 Claims**



1. An exposure control device for a camera having a photometric unit for measuring brightness of an object and its ambient brightness individually, a range finding unit for measuring a distance from the device to the object, and a strobe light unit, said device comprising:

backlight detecting means for detecting whether the object is in a backlight condition or not on the basis of the brightness of the object and its ambient brightness measured by the photometric unit; and

means for allowing the strobe light to flash in either case the brightness of the object measured by the photometric unit is smaller than a predetermined brightness or the object is detected to be in the backlight condition by the backlight detecting means, if the distance from the device to the object measured by the range finding unit is smaller than a predetermined distance, and for lengthening an exposure time without allowing the strobe light to flash within the limits of a predetermined time in case the object is detected to be in the backlight condition by the backlight detecting means, if the distance from the device to the object measured by the range finding unit is larger than the predetermined distance.

4,878,082

AUTOMATIC IMAGE DENSITY CONTROL APPARATUS

Kouji Matsushita; Keigo Tange, and Shizuo Yuge, all of Osaka, Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Filed Mar. 10, 1988, Ser. No. 166,209
Claims priority, application Japan, Mar. 12, 1987, 62-57476
Int. Cl.[4] G03B *15/00*
U.S. Cl. 355—208 **39 Claims**

1. An automatic image density control apparatus comprising;

a photosensitive member,

a charging means for charging a surface of said photosensitive member at a predetermined potential,

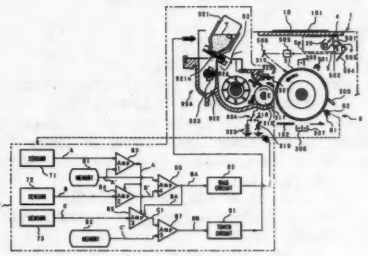
an exposing means for partly erasing the charge on the surface of said photosensitive member to form a reference latent image on the surface of said photosensitive member charged by said charging means,

a developing means for contacting a developer to the surface of said photosensitive member to develop said reference latent image,

a non-developing portion forming means for forming the non-developing portion on the surface of said photosensitive member to which the developer is not stuck,

a first density detecting means for detecting and outputting the density of said non-developing portion,

an image information generating means for outputting a value associated with an output value obtained by said



first density detecting means and a preset non-developing portion reference value,

a second density detecting means for detecting and outputting the image density of a reference real image developed from the reference latent image,

a correcting means for correcting the outputted value obtained by said second density detecting means according to the outputted value from said image information generating means, and

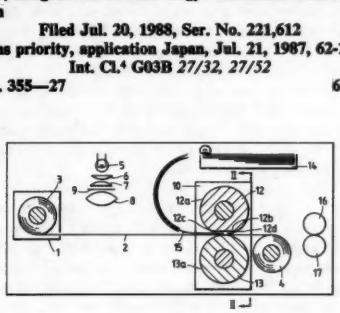
a density control means for comparing the outputted value from said correcting means with the preset reference value to control the image density according to its compared result.

4,878,083

PRESSURE DEVELOPING DEVICE IN IMAGE RECORDING APPARATUS

Kiyoharu Hayakawa, and Takashi Tomizawa, both of Aichi, Japan, assignors to Brother Kogyo Kabushiki Kaisha, Aichi, Japan

Filed Jul. 20, 1988, Ser. No. 221,612
Claims priority, application Japan, Jul. 21, 1987, 62-112494
Int. Cl.[4] G03B *27/32, 27/52*
U.S. Cl. 355—27 **6 Claims**



1. In an image recording apparatus of the type in which a color image on an image carrying sheet is recorded on a developer sheet wherein said color image is formed as a latent image on a photosensitive and pressure-sensitive recording sheet upon exposure to light which bears said color image, and said

latent image is developed into a visible color image and transferred onto said developer sheet superposed on said photosensitive and pressure-sensitive recording sheet by a pressure developing device, said device comprising a pair of rollers, each of said pair of rollers being rotatable about its own axis and having a first surface area on its periphery wherein each of said first surface areas are in pressure contact with each other to pressure develop said latent image and transfer said visible color image when said photosensitive and pressure-sensitive recording sheet and said developer sheet held in superposed relation are passed through a nip between said first surface areas, and at least one of said pair of rollers having a second surface area on its periphery, said second surface area extending axially of said roller wherein said second surface is free from pressure contact with another roller.

4,878,084
METHOD AND DEVICE FOR FEEDING SHEET IN IMAGE RECORDING APPARATUS

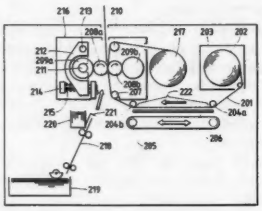
Kiyoharu Hayakawa, Ama; Yumio Matsumoto, Kasugai; Masashi Ueda, Nagoya; Akira Sago, Nagoya, and Osamu Tagaki, Nagoya, all of Japan, assignors to Brother Kogyo Kabushiki Kaisha, Nagoya, Japan

Filed Jun. 3, 1988, Ser. No. 201,915

Claims priority, application Japan, Jun. 8, 1987, 62-142552; Dec. 15, 1987, 62-191017

Int. Cl.[4] G03B *27/32, 27/52*

U.S. Cl. 355—27 **6 Claims**



1. A device for feeding an image recording sheet so as to overlap said image recording sheet with a light-exposed sheet which carries a latent image recorded thereon in an image recording apparatus, said image recording apparatus including an exposure unit for light-exposure to said sheet for forming said latent image; and a pressure developing unit disposed downstream of said exposure unit at which said light-exposed sheet and said image recording sheet are overlappingly pressed; said device for feeding comprising:

stop means for temporarily preventing said image recording sheet from being fed to said developing unit;

driving means for selectively allowing said image recording sheet to pass therethrough in response to movement of said light-exposed sheet; and,

a sheet guide for guiding travel of said image recording sheet toward said pressure developing unit, a downstream end of said guide being disposed in a vicinity of an outlet end of said exposure unit, said stop means being disposed at said sheet guide and adapted to abut against a leading edge of said image recording sheet; and a movable roller movably disposed with respect to said sheet guide and positioned at an upstream side of said stop means, said driving means being connected to said movable roller, said movable roller providing a first position for effectuating said stop means to prevent said image recording sheet from moving, and providing a second position for incapacitating said stop means.

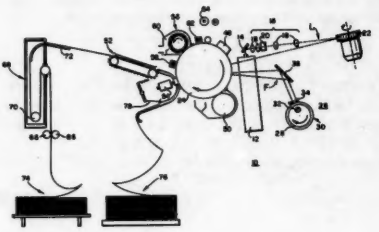
4,878,085
CYLINDER AND HUB LOCKING METHOD AND APPARATUS

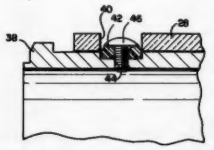
Leonard Ward, Melbourne, and George Darnofall, West Melbourne, both of Fla., assignors to Storage Technology Corporation, Louisville, Colo.

Filed Apr. 28, 1987, Ser. No. 43,486

Int. Cl.[4] G03B *27/22, 27/58*

U.S. Cl. 355—47 **8 Claims**





6. A forms overlay station for projecting an image of a film negative to a photoconductor drum of a laser electrophotographic printer, wherein the photoconductor drum is rotatable at a constant speed, comprising:

a transparent drum for mounting the film negative, said transparent drum having a predetermined inside diameter and a predetermined wall thickness, and also having formed therein at each end thereof a plurality of holes spaced equidistantly radially thereabout, said plurality of holes having an equal diameter;

light means, mounted within said transparent drum, for projecting the image therefrom;

drive means for rotating said transparent drum synchronously with the photoconductor drum, said drive means including a pair of drive hubs, each of which has an outside diameter that is slip fit within said predetermined inside diameter of said transparent drum at respective ends thereof, and each of which includes a plurality of holes that are counterbored to a preselected depth and are of the same diameter as said holes in said transparent drum, each said counterbored hole juxtaposed to a respective one of said holes in said transparent drum;

a motor coupled to rotate said drive hubs; and

a plurality of O-rings and screw means for coupling said transparent drum to said drive hubs through said juxtaposed holes, wherein each said O-ring has an outside diameter substantially equal to the diameter of said juxtaposed holes and a thickness of about twice said preselected depth, said screw means compressing said O-rings in said juxtaposed holes whereby said compressed O-rings in shear, absorb torque loading between said drive hubs and said transparent drum.

4,878,086

FLAT PANEL DISPLAY DEVICE AND MANUFACTURING OF THE SAME

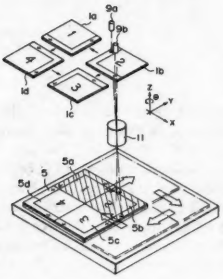
Junji Isohata, Tokyo; Masao Totsuka, Ohmiya, and Yoshiharu Nakamura, Yokohama, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Division of Ser. No. 203,558, Jun. 1, 1988, Pat. No. 4,814,830, which is a continuation of Ser. No. 129,363, Nov. 30, 1987, abandoned, which is a continuation of Ser. No. 838,824, Mar. 12, 1986, abandoned. This application Mar. 20, 1988, Ser. No. 326,108

Claims priority, application Japan, Apr. 1, 1985, 60-068736; Apr. 17, 1985, 60-81840

Int. Cl.[4] G03B *27/32, 27/44*

U.S. Cl. 355—77 1 Claim



1. A method of exposure usable with an optical projection system, for manufacture of a flat panel display device, comprising the steps of:

providing first and second masks having different mask patterns, including a display element forming pattern;

placing a workpiece having a surface on a movable stage;

moving the movable stage so that two-dimensionally arrayed different portions of the workpiece surface are placed, in sequence, at an exposure station at which the portion of the workpiece surface placed thereat can be patterningly exposed by projection by the optical projection system; and

handling the first and second masks and selecting a pattern to be projected by the optical projection system upon the portion of the workpiece surface placed at the exposure station,

wherein the moving of the movable stage is so interrelated to the handling of the first and second masks and the selection of the pattern to be projected that under the influence of the optical projection system plural display element forming patterns are printed two-dimensionally on a first region of the workpiece surface while plural driving element forming patterns are printed on a second region of the workpiece surface outside of the first region.

4,878,087

IMAGE FORMING APPARATUS WITH JAM REMOVAL MECHANISM

Toshiyuki Sakai, and Toshio Sakata, both of Osaka, Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Filed Jan. 12, 1988, Ser. No. 143,042

Claims priority, application Japan, Jan. 13, 1987, 62-6910

Int. Cl.[4] G03G *15/00, 21/00;* B65H *29/00, 7/02*

U.S. Cl. 355—207 3 Claims

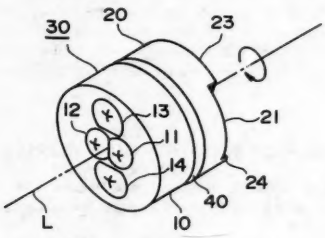
1. An image forming apparatus for forming images on a single sheet a plural number of times by feeding the sheet again to an image forming unit after an image is formed on one side of the sheet by said image forming unit, said image forming apparatus including:

an apparatus body in which said image forming unit is incorporated, said apparatus body having a feeding unit which stores sheets to be fed into the image forming unit;

a sheet reversing unit, assembled with said apparatus body, having a discharge section, which receives sheets with images formed thereon;

a primary passage to guide each sheet from said feeding unit to said discharge section through said image forming unit;

a secondary passage branching from a downstream end of said primary passage in said sheet reversing unit and extending up to an upstream end of the said primary passage to guide each sheet which has passed said image forming unit again up to said image forming unit, said secondary passage in said sheet reversing unit having a sheet removing area which includes a guide plate capable of being opened to expose the interior of the secondary passage to



the exterior of the sheet reversing unit to permit the removal of the sheet present in the interior;

a detecting means disposed in said secondary passage to detect a jammed sheet present in the secondary passage;

a re-feed unit disposed within said apparatus body, forming a port of said secondary passage and provided with a drive means for driving each sheet present in the secondary passage forward toward the upstream end of said primary passage and also driving it backward toward the downstream end of the primary passage; and

a control means which controls said drive means so that when said detecting means detects a jam in the secondary passage of said re-feed unit, the jammed sheet is moved backward up to said sheet removing area in the said sheet reversing unit.

4,878,088

DEVELOPING UNIT OF ELECTROPHOTOGRAPHIC APPARATUS

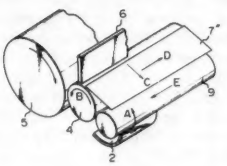
Akio Nakanishi, Funabashi; Toshio Hino, Tokyo; Yoshio Iino, Yokohama; Kazuhisa Suetani, Kawasaki; Yoji Houki, Tokyo, and Hirotoshi Ikuta, Yokohama, all of Japan, assignors to Fujitsu Limited, Kawasaki, Japan

Filed Jul. 1, 1986, Ser. No. 880,920

Claims priority, application Japan, Jul. 2, 1985, 60-145087; Sep. 12, 1985, 60-140011[U]

Int. Cl.[4] G03G *15/08*

U.S. Cl. 355—244 14 Claims



1. A developing unit for developing an electrostatic latent

image formed on an image forming member, by adsorbing electrostatic powder developer, transferred by a developing roller, onto the latent image, comprising:

(a) a stirring roller having a screw provided with paddles, each having a helix angle with respect to an axis of the screw, said screw transferring said powder developer stored in a developer casing toward said developing roller and to the circumference thereof to supply said powder developer for said developing roller,
wherein said screw is provided with approximately eight paddles, each being twisted by approximately 180° over the total length of said screw;

(b) a blade for regulating a layer thickness of said powder developer which is transferred to said image forming member by said developing roller; and

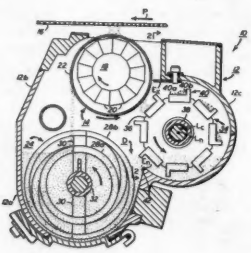
(c) a flow regulating plate for biasing a flow of said powder developer, which has been removed by said blade and returned to said developer casing due to the force of gravity, in a direction opposite to a direction in which the powder developer is transferred by said screw.

4,878,089

DEVELOPER STATION FOR A REPRODUCTION APPARATUS

Vladimir S. Guslits, Rochester, and Richard A. Weitzel, Hilton, both of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Aug. 11, 1988, Ser. No. 230,936
Int. Cl.[4] G03G *15/09*
U.S. Cl. 355—253 **14 Claims**



1. In a magnetic brush developer station for an electrostatographic reproduction apparatus, said developer station including a housing having a first portion adapted to contain developer material, a second portion containing a magnetic brush for applying developer material to a charge pattern bearing member, and a third portion containing a mechanism for transporting developer material from said first portion of said housing to said magnetic brush, said transporting mechanism comprising:

a roller;

means, located about the periphery of said roller, for picking up a quantity of developer material;

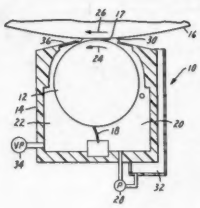
means for mounting said roller in said third portion of said housing for rotation about the longitudinal axis thereof within a portion of the interior wall of said housig in order to transport developer material from said first portion of said housing to said magnetic brush, said wall portion being a segment of a cylinder whose axis is offset in relation to the longitudinal axis of said roller so that said pickup means, in the direction of rotation of said roller, is closest to said wall at the entrance portion thereto and farthest from said wall at the exit portion thereto whereby compaction of developer material is substantially prevented.

4,878,090

VACUUM REMOVAL OF LIQUID TONER FROM A RECORD MEMBER

George G. Lunde, St. Paul, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Aug. 23, 1988, Ser. No. 235,948
Int. Cl.[4] G03G *15/10*
U.S. Cl. 355—256 **5 Claims**



1. A development apparatus for the application of liquid toner to the surface of an electrographic record bearing member, comprising:

a development electrode in spaced, operative liquid toner applying proximity to said record bearing member;

a shroud surrounding said developing electrode and including a blade extending into said space between said development electrode and said record bearing member;

means for providing a continuous supply of said liquid toner and forcing said liquid toner into said space between said development electrode and said record member;

means associated with said shroud for removing said liquid toner from said space including a source of vacuum for drawing air around said blade in addition to removing said liquid toner from said space, wherein;

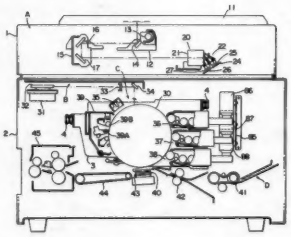
said blade is positioned with respect to said record member so as to cause said air drawn around said blade to strike said record member and remove excess liquid toner from the surface of said record member.

4,878,091

MULTICOLOR IMAGE FORMING APPARATUS

Shizuo Morita; Kazushi Hayakawa; Kunio Ito; Shunji Matsuo; Masakazu Fukuchi, and Noboru Hatakeyama, all of Hachioji, Japan, assignors to Konica Corporation, Tokyo, Japan

Filed Sep. 15, 1988, Ser. No. 244,935
Claims priority, application Japan, Sep. 17, 1987, 62-234494; Oct. 26, 1987, 62-270553
Int. Cl.[4] G03G *15/08, 15/01*
U.S. Cl. 355—260 **13 Claims**



1. A multicolor image forming apparatus comprising an apparatus body, a plurality of developing devices for forming a multicolor image, a plurality of resupply devices for replenishing toner particles to each of said developing devices, and a

support member for integrally supporting said plurality of developing devices, wherein said support member integrally supporting said plurality of developing devices is mounted detachably on said apparatus body, and each of said developing devices and each of said resupply devices corresponding to each of said developing devices are automatically connected to and disconnected from each other, when said support member is inserted into and withdrawn from the apparatus body.

4,878,092

METHOD OF CONTROLLING A FIXING UNIT OF AN IMAGE FORMING APPARATUS

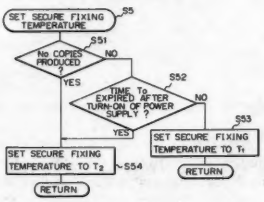
Atsushi Arai, Ichikawa, Japan, assignor to Ricoh Company, Ltd., Tokyo, Japan

Filed May 27, 1988, Ser. No. 199,870

Claims priority, application Japan, May 29, 1987, 62-83622[U]

Int. Cl.⁴ G03G *15/20*

U.S. Cl. 355—285 **6 Claims**



1. In a method of controlling a fixed unit which is installed in a copier which includes a fixing roller and a pressing roller and in which copier said fixing unit is operated to fix a toner image on a sheet of copy paper when the fixing roller is at a secure fixing temperature defined as a lower limit at temperatures above which the toner image can be satisfactorily fixed, the improvement comprising:

selectively establishing at least two temperatures as secure fixing temperatures of the fixing unit in dependence on at least one predetermined condition.

4,878,093

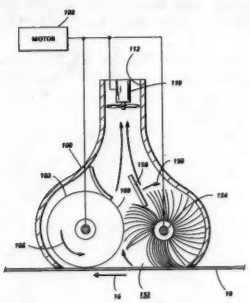
DUAL ROLL CLEANING APPARATUS FOR CHARGE RETENTIVE SURFACE

Cyril G. Edmunds, Webster, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed Oct. 3, 1988, Ser. No. 258,264

Int. Cl.⁴ G03G *15/00*

U.S. Cl. 355—296 **9 Claims**



1. Reproduction apparatus including a charge retentive surface; image forming means for forming a latent image on the charge retentive surface; developing means for developing the latent image with toner; transfer means for transferring the developed toner image from the charge retentive surface to a support surface; and cleaning means for removing residual toner and debris from the charge retentive surface, said cleaning means comprising:

a cleaning housing;

a brush cleaning roll journaled for rotating movement within said housing and supported in cleaning relationship with the charge retentive surface;

an abrading foam cleaning roll journaled for rotating movement within said housing and supported in cleaning relationship with the charge retentive surface;

said foam cleaning roll arranged downstream from said brush cleaning roll member;

drive means for moving each of said foam cleaning roll and brush cleaning roll in said rotating movement, whereby movement thereof allows said foam cleaning roll and brush cleaning roll to collect toner and debris from the charge retentive surface;

means for removing toner from said foam cleaning roll and brush cleaning roll in said rotating movement, for transport to an output.

4,878,094

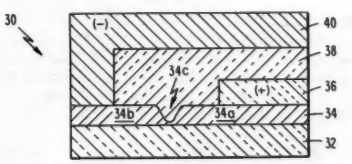
SELF-POWERED ELECTRONIC COMPONENT AND MANUFACTURING METHOD THEREFOR

Minko Balkanski, 2 Avenue Camoens, 75016 Paris, France

Filed Mar. 30, 1988, Ser. No. 175,311

Int. Cl.⁴ H01L *39/22*

U.S. Cl. 357—5 **5 Claims**



1. A self-powered semiconductor component, comprising:

a semiconductor substrate;

layers of semiconductor materials having different electrical conductivities and together forming an electronic component; and

a microbattery integrated with said component, said microbattery comprising

(a) a layer of an alkali metal which provides a source of ions and forms the negative electrode of the microbattery;

(b) a layer of an intercalation compound capable of inserting ions issued from the alkali metal and forming the positive electrode of the battery; and

(c) a layer of an ion-superconducting solid electrolyte glass of high ionic conductivity forming a separator between said alkali metal and intercalation compound layers.

4,878,095

SEMICONDUCTOR DEVICE IN PARTICULAR A HOT ELECTRON TRANSISTOR

Simon J. Bending, and Elmar Böckenhoff, both of Leonberg, Fed. Rep. of Germany, assignors to Wissenschaften e.V., Gottingen, Fed. Rep. of Germany

Filed Nov. 9, 1987, Ser. No. 118,504

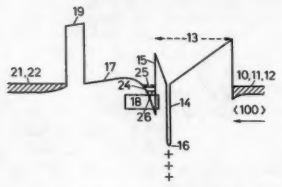
Claims priority, application European Pat. Off., Jun. 11, 1987, 87116451

Int. Cl.⁴ H01L *29/80*

U.S. Cl. 357—16 **31 Claims**

31. An epitaxially grown compositional semiconductor de-

vice comprising a majority carrier injection electrode, a control electrode, and a majority carrier extraction electrode, with said majority carrier injection electrode providing contact to a majority carrier injection layer of semiconductor material, and with said control electrode providing contact to a control layer of semiconductor material, said majority carrier injection layer being separated from said control layer by a separating layer system comprising a layer system having at least two



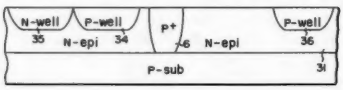
layers of different compositions, adjoining each other at an interface with one of said layers being adjacent said base layer, said two layers being substantially undoped, wherein a two-dimensional charge carrier gas is formed in a potential well at said interface on application of a bias voltage between said emitter electrode and said base electrode, and wherein said one of said two layers adjacent said base layer is sufficiently thin to permit tunneling of charge carriers from said charge carrier gas therethrough.

4,878,096

SEMICONDUCTOR DEVICE IC WITH DMOS USING SELF-ALIGNED BACK GATE REGION

Koji Shirai, and Ken Kawamura, both of Yokohama, Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Mar. 18, 1987, Ser. No. 27,406
Claims priority, application Japan, Mar. 28, 1986, 61-68702
Int. Cl.[4] H01L *27/02*
U.S. Cl. 357—42 **8 Claims**



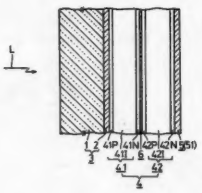
1. A semiconductor device comprising:
at least a first element region and a second element region of a second conductivity type formed so as to be electrically isolated from each other on a semiconductor substrate of a first conductivity type;
a complementary MOS transistor in which an N-channel MOS tranistor and a P-channel MOS transistor are respectively formed in a first well diffusion layer of the first conductivity type and a second well diffusion layer of the second conductivity type formed in said first element region of the second conductivity type, said second well diffusion layer having an impurity concentration higher than that of said first element region; and
a double-diffused MOS transistor including a well diffusion layer of the first conductivity type formed in said second element region of the second conductivity type and a back gate region of the first conductivity type formed so as to be self-aligned with a gate electrode using said electrode as a blocking mask.

4,878,097

SEMICONDUCTOR PHOTOELECTRIC CONVERSION DEVICE AND METHOD FOR MAKING SAME

Shunpei Yamazaki, Tokyo, Japan, assignor to Eastman Kodak Company, Rochester, N.Y.

Continuation of Ser. No. 47,593, May 11, 1987, abandoned, which is a continuation of Ser. No. 733,739, May 14, 1985, abandoned. This application Oct. 21, 1988, Ser. No. 277,451
Claims priority, application Japan, May 15, 1984, 59-97319; May 15, 1984, 59-97320
Int. Cl.[4] H01L *29/12*
U.S. Cl. 357—58 **12 Claims**



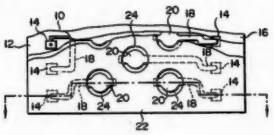
1. A photoelectric conversion device comprising:
a substrate;
a first doped non-single-crystalline semiconductor layer of a first conductivity type formed on said substrate;
a first intrinsic non-single-crystalline semiconductor layer formed on said first doped semiconductor layer;
a second doped non-single-crystalline semiconductor layer of a second conductivity type opposite to said first conductivity type formed on said intrinsic semiconductor layer;
a transparent conductive layer made of chromium silicide and having a thickness of 5–20 Å formed on said second doped semiconductor layer for the purpose of avoiding the impurity diffusion between said second and third doped semiconductor layers;
a third doped non-single-crystalline semiconductor layer of said first conductivity type deposited on said transparent layer;
a second intrinsic non-single-crystalline semiconductor layer formed on said third layer; and
a fourth doped non-single-crystalline semiconductor layer of said second conductivity type opposite to said first conductivity type formed on said second intrinsic semiconductor layer.

4,878,098

SEMICONDUCTOR INTEGRATED CIRCUIT DEVICE

Tamio Saito, Tokyo, and Kunio Yoshihara, Kawasaki, both of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Continuation of Ser. No. 95,216, Sep. 11, 1987, abandoned. This application Mar. 24, 1989, Ser. No. 328,747
Claims priority, application Japan, Sep. 16, 1986, 61-215811; Sep. 16, 1986, 61-215812
Int. Cl.[4] H01L *23/48, 23/14*
U.S. Cl. 357—68 **10 Claims**



1. A semicondcutor integrated circuit device, comprising:

a circuit frame;

a plurality of carrier modules arranged and held on the same area in said circuit frame so as to be adjacent to one another, each of said carrier modules including a plurality of rectangular integrated circuit chips which are close to one another in a row on the same plane, each of said rectangular integrated circuit chips having a chip surface which is parallel to said plane, and a plurality of internal terminals arranged along a peripheral edge portion of the chip surface, the internal terminal being used for inputting and outputting data to and from said integrated circuit chip;

an electrical insulating layer which covers the entire chip surface, except for the internal terminals;

a plurality of conductor leads each of which is connected sat one end to a corresponding inernal terminal of said plurality of internal terminals, said conductor leads extending along the insulating layer from the internal terminals towards a central portion of the chip surface, each of said conductor leads having a connecting terminal at its other end, said connecting terminal having an area wider than that of the corresponding internal terminal, said connecting terminals being distributed over the entire insulating layer, expect for those regions where the internal terminals are located;

first connecting means for electrically connecting said coonnecting terminals in each of said carrier modules to module terminals of the carrier module and distributing the module terminals over a connecting surface which is parallel to said plane and exposed to the outside; and

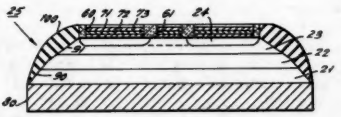
second connecting means for electrically connecting the module terminals of the respective carrier modules to one another and/or to another electrical device.

4,878,099

METALLIZING SYSTEM FOR SEMICONDUCTOR WAFERS

Anders Nilarp, Rancho Palos Verdes, Calif., assignor to International Rectifier Corporation, Los Angeles, Calif.

Filed Dec. 8, 1982, Ser. No. 447,760
Int. Cl.[4] H01L *23/54, 23/50*
U.S. Cl. 357—71 **6 Claims**



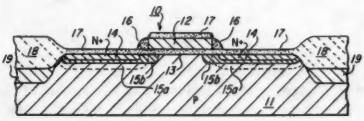
1. A semiconductor device comprising a wafer of semiconductor material having a metallizing system on a surface portion thereof; said wafer having a p-n junction therein which extends to said surface portion; said p-n junction intersecting said surface on a line which encloses said surface portion; said metallizing system comprising a layer of nickel silicide in contact with and adhering to the area of said surface portion enclosed by said p-n junction; a layer of solderable metal in electrical and mechanical contact with said layer of nickel silicide and being coextensive therewith; an expansion contact alloyed to the surface of said wafer opposite the surface carrying said metallizing system; the outer periphery of said wafer being tapered to reduce in diameter in a direction extending from said expansion contact toward said layer of solderable metal; said layer of solderable metal being resistant to a caustic etch.

4,878,100

TRIPLE-IMPLANTED DRAIN IN TRANSISTOR MADE BY OXIDE SIDEWALL-SPACER METHOD

James M. McDavid, Houston, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.

Continuation of Ser. No. 145,075, Jan. 19, 1988, abandoned, which is a division of Ser. No. 773,831, Sep. 4, 1985, abandoned, which is a continuation of Ser. No. 418,897, Sep. 16, 1982, abandoned. This application Feb. 23, 1989, Ser. No. 317,046
Int. Cl.[4] H01L *29/78*
U.S. Cl. 357—23.3 **2 Claims**



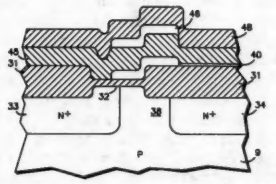
1. A field-effect transistor comprising a gate on a face of a semiconductor body, a channel beneath the gate, a heavily-doped drain region in said face spaced from the channel, first and second lightly-doped regions in the gap between the drain region and the channel, and a sidewall-spacer oxide segment above said gap, the impurity in said heavily-doped region being at a much higher doping level and diffused into the semiconductor body to a much lesser extent than the impurity in said lightly-doped regions, the impurities of the first and second regions being of differing diffusion coefficient and doping level providing a graded junction.

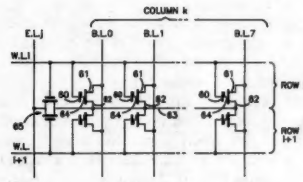
4,878,101

SINGLE TRANSISTOR CELL FOR ELECTRICALLY-ERASABLE PROGRAMMABLE READ-ONLY MEMORY AND ARRAY THEREOF

Ning Hsieh, 1573 Larkin Ave., San Jose, Calif. 95129, and Clinton C. Kuo, 9639 Vista View Dr., Austin, Tex. 78750

Filed Dec. 29, 1986, Ser. No. 947,212
Int. Cl.[4] H01L *29/78*
U.S. Cl. 357—23.5 **3 Claims**





1. An EEPROM array comprising a plurality of EEPROM cells each having a source, a drain, a floating gate, a control gate and tunnel means for selectively providing a tunneling path between said floating gate and said source, said array further comprising:

a first subset of said plurality of EEPROM cells, each of said

first subset of cells sharing a first common source and a first common control gate;

a second subset of said plurality of EEPROM cells, each of said second subset of cells sharing said first common source and a second common control gate;

a first erase select transistor having a source coupled to said first common source, a gate coupled to said first common gate, and a drain coupled to an erase conductor; and

a second erase select transistor having a source coupled to said first common source, a gate coupled to said second common control gate and a drain coupled to said erase conductor.

4,878,102

CHARGE-COUPLED DEVICE

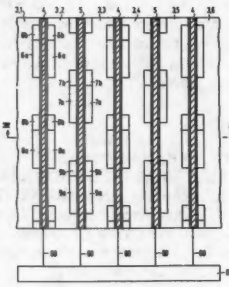
Jacobus G. C. Bakker, and Leonard J. M. Esser, both of Eindhoven, Netherlands, assignors to U.S. Philips Corp., New York, N.Y.

Continuation of Ser. No. 30,945, Mar. 26, 1987, abandoned. This application Nov. 18, 1988, Ser. No. 274,653

Claims priority, application Netherlands, Mar. 27, 1986, 8600786

Int. Cl.[4] H01L *29/78, 27/14, 29/06*

U.S. Cl. 357—24 **9 Claims**



1. A charge-coupled semiconductor device comprising:

a charge transport channel at a major surface of a semiconductor body and in which discrete charge packets can be transported in successive steps from a first position at one end of the channel to a second position at the other end thereof, such channel having regions therein for storing such discrete charge packets; and

electrodes adjacent such storage regions for transferring charge packets from said first position to said second position in response to alternating control voltages applied to such electrodes;

characterized in that:

said electrodes consist of first and second continuous elongated conductive strips coextensively disposed on opposite sides of the charge transport channel and extending along a plurality of storage regions;

said storage regions in the charge transport channel are progressively situated on opposite sides of such channel between said first position and said second position, and extend transversely into said channel to a depth less than half the thickness thereof, thereby leaving a central region of said channel unobstructed between said first position and said second position; and

the charge transport channel has a thickness and doping concentration such that when said alternating control voltages are applied to said electrodes and electrical field is produced in said transport channel in a direction from said first position to said second position.

4,878,103

CHARGE TRANSFER MEMORY AND FABRICATION METHOD THEREOF

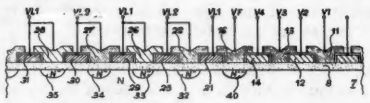
Yvon Cazaux, Grenoble; Didier Herault, Seyssinet; Yves Thenoz, Grenoble, and Pierre Blanchard, Echirolles, all of France, assignors to Thomson-CSF, Paris, France

Filed Jan. 17, 1989, Ser. No. 297,651

Claims priority, application France, Jan. 19, 1988, 88 00542

Int. Cl.[4] H01L *29/78*; G11C *19/28*

U.S. Cl. 357—24 **2 Claims**



1. A charge transfer memory comprising a succession of charge transfer shift registers said to have "four phases and two levels of electrodes" and a register for the reading of the charges of the shift registers, said to have "two phases and three levels of electrodes", said shift registers and said reading register being made on a semiconductor substrate, with a first type of doping, supporting a semiconductor layer with a second type of doping, said layer being itself covered with an insulating layer, each shift register further comprising, parallel to a first axis, successive groups of electrodes, each group comprising four electrodes for the transfer and storage of charges, in contact with the insulating layer, to make the charges flow in a pre-determined direction, through transfer potentials and potential wells appearing under these electrodes, in relation with the four phases of cyclical voltages with identical values, respectively applied to the electrodes of each group, the charges being thus conveyed to an end of the shift register which ends in a final transfer electrode, carried to a pre-determined potential, said reading register comprising, along a second axis, for each shift register, and in order to make the charges flow always in one and the same direction along the second axis, at least one pair of reading electrodes, said pair being in contact with the insulating layer and comprising a reading storage electrode, contiguous to the final electrode of the shift register considered, and a reading transfer electrode contiguous to the reading storage electrode corresponding to the shift register considered, said reading transfer electrode being also contiguous to a reading storage electrode corresponding to a final electrode of a shift register adjacent to the considered register in said succession of shift registers, semiconductor zones with a third type of doping being made so as to respectively face the transfer electrodes of the reading register, the charges flowing in this register by means of potential wells and transfer potentials appearing beneath the successive pairs of electrodes, each pair of reading electrodes corresponding to a shift register, being supplied with a cyclical voltage having equal values but in phase opposition with a cyclical voltage supplying the pair of reading electrodes of the adjacent shift register in said succession, wherein each shift register further has a zone with a fourth type of doping made in the layer with the second type of doping, facing the final electrode.

4,878,104

OPTICALLY PUMPED QUANTUM COUPLED DEVICES

Mark A. Reed, Dallas, and Gary A. Frazier, Garland, both of Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.

Filed Apr. 19, 1985, Ser. No. 725,030

Int. Cl.[4] H01L *27/14, 45/00, 29/205, 29/78*

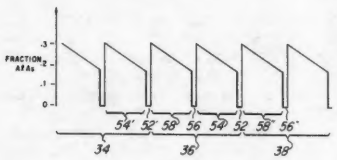
U.S. Cl. 357—30 **16 Claims**

1. An electronic charge transfer device, comprising:

(a) a semiconductor substrate, said substrate having an energy band edge in a first direction in said substrate charac-

terized by a series of substantial variations, said variations creating unidirectional electric field-free drift or tunneling; and

(b) a source of light, said source directed at said substrate



and having photon energies comparable to or greater than the energies associated with said variations, whereby absorption of photons from said source pumps carriers in said energy band through the potentials associated with said variations in said first direction.

4,878,105

SEMICONDUCTOR DEVICE HAVING WIRING LAYER COMPOSED OF SILICON FILM AND ALUMINUM FILM WITH IMPROVED CONTACT STRUCTURE THEREOF

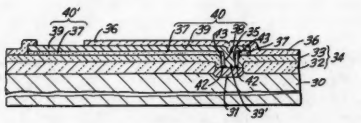
Noboru Hirakawa, and Yasukazu Inoue, both of Tokyo, Japan, assignors to NEC Corporation, Tokyo, Japan

Filed May 20, 1988, Ser. No. 196,389

Claims priority, application Japan, May 21, 1987, 62-125221

Int. Cl.[4] H01L *29/34, 29/04, 23/48*

U.S. Cl. 357—59 **8 Claims**



1. A semiconductor device, comprising a monocrystalline silicon substrate having a major surface and an impurity region, an insulating layer formed on said major surface of said substrate and having an upper surface, said insulating layer being provided with a contact hole such that said contact hole is formed by an enclosing side wall made of said insulating layer and that said contact hole exposes part of said impurity region of said substrate, a thin insulating film having a ring plan shape and formed on a peripheral portion of said part of said impurity region within said contact hole, said thin insulating film having an upper surface, and a wiring layer formed on said insulating layer and electrically connected to said part of said impurity region, said wiring layer including a first polycrystalline silicon film doped with impurity atoms and formed on said upper surface of said insulating layer, said first polycrystalline silicon film having a first section having a first width and a second section having a second width greater than said first width and being formed continually with said first section of said first polycrystalline silicon film, a second polycrystalline silicon film doped with impurity atoms and having a ring plan shape and formed on said side wall made of said insulating layer and on said thin insulating film within said contact hole, and an aluminum film having first, second and third sections, said first section of said aluminum film having a width equal to said first width and being formed just on and in contact with said first section of said first polycrystalline silicon film, said second section of said aluminum film having a width equal to said second width and being formed continually with said first section of said aluminum film and being formed just on and in contact with said second section of said first polycrystalline silicon film to form a bonding pad with said second section of said first polycrystalline silicon film, and said third section of said aluminum film being formed continually with said first section of said aluminum film and being formed on said second polycrystalline silicon film and directly in contact with a center portion of said part of said impurity region enclosed by said peripheral portion within said contact hole.

4,878,106

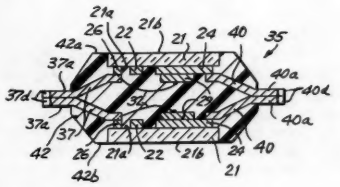
SEMICONDUCTOR CIRCUIT PACKAGES FOR USE IN HIGH POWER APPLICATIONS AND METHOD OF MAKING THE SAME

Klaus Sachs, Osterode/Harz, Fed. Rep. of Germany, assignor to Anton Piller GmbH & Co. KG, Osterode/Harz, Fed. Rep. of Germany

Continuation of Ser. No. 936,797, Dec. 2, 1986, abandoned. This application May 6, 1988, Ser. No. 191,841

Int. Cl.[4] H01L *23/30, 23/18, 23/34*

U.S. Cl. 357—72 **11 Claims**



1. A semiconductor circuit package for use in high power applications; said package comprising:

(a) first and second substrate plates each having (i) a first flat face, (ii) a second flat face parallel to said first flat face, and (iii) an outwardly directed peripheral edge face, said substrate plates being arranged in spaced, substantially parallel relation to each other with said first flat faces thereof directed toward each other and with said second flat faces thereof directed away from each other, at least one of said substrate plates on said first flat face thereof having affixed thereto a respective plurality of discrete planar conductor layers, and at least one of said substrate plates at said first flat face thereof carrying semiconductor circuit means electrically connected to one or more of said planar conductor layers;

(b) leads extending laterally of said substrates plates, each lead having (i) an outward end region adapted to be electrically connected to exterior circuit components, and (ii) an inward end region affixed to a respective one of said planar conductor layers; and

(c) a transfer molded body of thermosetting semiconductor grade molding compound filling the space between said substrate plates and encapsulating said first flat faces of said substrate plates, said conductor layers, said semiconductor circuit means and said inward end regions of said leads, said outward end regions of said leads and said second flat faces of said first and second substrate plates being free of molding compound;

(d) said package by virtue of its construction being resistant to thermally induced bending of said substrate plates both during and at all times subsequent to the molding of said body of molding compound;

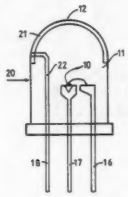
(e) whereby said second flat face of each of said first and second substrate plates remains substantially flat and substantially parallel to said second flat face of the other of said first and second substrate plates, and the package is adapted for full-surface contact of each substrate plate at said second flat face thereof with a respective heat sink.

4,878,107

TOUCH SENSITIVE INDICATING LIGHT

William R. Hopper, 119 Errol Street, North Melbourne, Victoria 3051, Australia

PCT No. PCT/AU86/00324, § 371 Date Jun. 26, 1987, § 102(e) Date Jun. 26, 1987, PCT Pub. No. WO87/02846, PCT Pub. Date May 7, 1987
PCT Filed Oct. 29, 1986, Ser. No. 84,795
Claims priority, application Australia, Oct. 29, 1985, PH3151; Sep. 9, 1986, PH7909
Int. Cl.[4] H01L *23/28*
U.S. Cl. 357—72 20 Claims



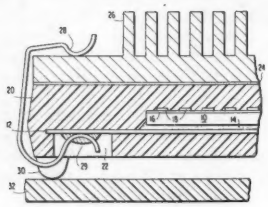
1. A touch sensitive light emitting diode comprising a diode encapsulated in a plastics dome and externally operable touch sensitive switching means encapsulated within the plastics dome, the switching means including an output to external electronics and the diode providing visual indication of the state of the switching means.

4,878,108

HEAT DISSIPATION PACKAGE FOR INTEGRATED CIRCUITS

Douglas W. Phelps, Jr., and William C. Ward, both of Burlington, Vt., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Jun. 15, 1987, Ser. No. 61,649
Int. Cl.[4] H01L *23/02*
U.S. Cl. 357—81 26 Claims



1. A package for heat dissipation of electronic components comprising:

an electronic component mounted on a strip of thermally conductive material;

a plastic body molded to encapsulate said electronic component and said strip of thermally conductive material, said plastic body having a recess formed during molding by ejector pins to expose said strip of thermally conductive material;

an external heat sink affixed to said plastic body;

thermally conductive means to establish via said recess thermal contact between said strip of thermally conductive material and said external heat sink to enhance the dissipation heat generated by said electronic component;

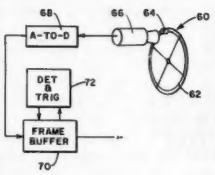
wherein said thermally conductive means comprises a heat transfer spring clip having a pair of contact surfaces, one of said contact surfaces disposed in said recess in contact with said strip of thermally conductive material and the second of said contact surfaces contacting said external heat sink.

4,878,109

UNSYNCHRONIZED MULTISPECTRAL VIDEO FILTERING SYSTEM WITH FILTER IDENTIFICATION SENSOR WITHIN FIELD OF VIEW AND VIDEO SIGNAL RESPONSIVE

W. Daniel Hillis, Cambridge, Mass., assignor to Thinking Machines Corporation, Cambridge, Mass.

Continuation of Ser. No. 846,729, Apr. 1, 1986, abandoned. This application Feb. 8, 1988, Ser. No. 154,490
Int. Cl.[4] H04N *9/07*
U.S. Cl. 358—42 3 Claims



1. A video system for identifying boundaries of sequentially filtered video signals comprising:

video camera means for providing video output signals from a field of view;

means for passing a sequence of filters between said video camera and the field of view thereby filtering said field of view resulting in a video output signal which includes a sequential stream of filtered signals, each signal having a distinguishable video characteristic representative of one of the filters in the sequence of filters;

means for assembling said stream of filtered signals into a unitary representation of said field of view;

means for sensing a position of the sequence of filters to identify which filter is in the field of view;

means, operative in response to the sensed filter position, for causing said assembling means to assemble said stream of filtered signals, providing a video output signal assembled according to which filter in said sequence of filters is in the field of view;

means for providing request signals for assemblying video signals each request signal corresponding to a selected filter; and

means for operating said causing means in response to coincidence of said request signals and sensing of the corresponding filter being in the field of view.

4,878,110

COLOR IMAGE PROCESSING APPARATUS WHICH ACCURATELY REGISTERS MULTIPLE COLOR IMAGES BY COUNTING PULSES FROM A TIMER RESET BY A DRUM INDEX SIGNAL

Hiroyuki Maruyama; Tadao Kishimoto; Toshifumi Isobe, and Jun Yokobori, all of Hachioji, Japan, assignors to Konishiroku Photo Industry Co., Ltd., Tokyo, Japan

Filed Aug. 13, 1987, Ser. No. 85,087
Int. Cl.[4] H04N *1/46*
U.S. Cl. 358—75 19 Claims

1. A color image-processing apparatus comprising a scanning means for scanning and photoelectrically converting a color image on an original document into color image signals;

a signal-processing means for producing a plurality of color component signals on the basis of said color image signals;

an optical means for projecting a light beam corresponding to a selected one of said color component signals onto an

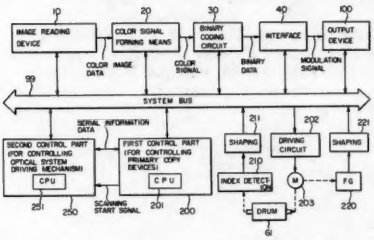
image forming means to form a corresponding image thereon;

said image forming means being rotatable so as to form a plurality of color toner images each corresponding to a respective one of said color component signals in such a manner that said plurality of color toner images are formed at the same position on said image forming means during plural rotations thereof;

a control means repeatedly actuating said scanning means, said signal processing-means, said optical means, and said image forming means so that said plurality of color toner images are formed at the same position on said image forming means;

an index means for generating an index signal at a time corresponding to an initial image forming point of a color toner image to be formed for each rotation of said image forming means; and

said control means determining scanning-start timing of said scanning means by an interrupt process in response to the



index signal so that the initial image forming point of said color toner image to be formed is registered at the same position as that of another color toner image which has already been formed on said image forming means.

16. A color image processing apparatus comprising an optical means for projecting a light beam corresponding to a color image signal onto an image forming means, said image forming means being rotatable so as to form a latent image thereon corresponding to said color image signal in response to said light beam;

a motor for driving said image forming means;

an encoder with said motor, for generating an encoder signal;

an index means, associated with said image forming means, for generating an index signal representing a position of said image forming means; and

a control means for selecting one of said encoder signal and said index signal in accordance with a selected copy mode and for controlling start timing of said optical means based thereon.

4,878,111

PROCESS AND APPARATUS FOR THE PREPARATION OF PHOTOGRAPHIC IMAGES FROM TRANSPARENT MASTERS

Armin Meyer, Belfaux, Switzerland, assignor to Ciba-Geigy AG, Basel, Switzerland

Filed Aug. 16, 1988, Ser. No. 232,769

Claims priority, application Switzerland, Aug. 21, 1987, 3214/87

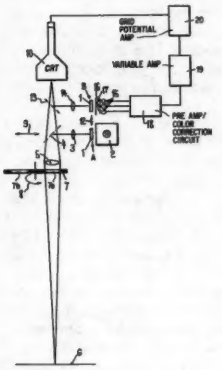
Int. Cl.[4] H04N *1/46*

U.S. Cl. 358—75 **16 Claims**

1. A process for the production of photographic images of transparent masters, comprising the steps of:

producing a first image of the transparent master on photographic material by means of a light source and optical means in a first beam path;

producing a second image of the transparent master on said photographic material coincident with said first image, for color and contrast correction, by means of a CRT in a second beam path, the CRT being controlled to produce said second image by a feedback loop comprising the CRT, the master, an image measuring means, a computer



unit responsive to said image measuring means and again the CRT, whereby the geometric image distortions of the CRT are compensated and wherein in each location in which the light point is momentarily present the brightness of the image point is calculated and immediately corrected.

4,878,112

ELECTRONIC TYPE ENDOSCOPE APPARATUS FOR USE IN NTSC/PAL SYSTEMS

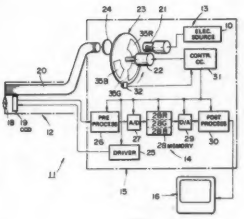
Shoichi Ieoka, Hachioji, Japan, assignor to Olympus Optical Co., Ltd., Tokyo, Japan

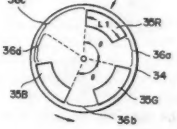
Filed Jul. 26, 1988, Ser. No. 224,527

Claims priority, application Japan, Jul. 27, 1987, 62-188604

Int. Cl.[4] H04N *7/18*; G61B *1/4*

U.S. Cl. 358—98 **17 Claims**





1. An electronic type apparatus comprising:

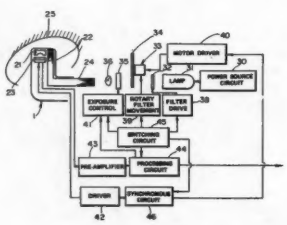
an electronic type endoscope means including,
an elongated insertable portion,
light guide means for transferring an illumination light which has been supplied to an incident end thereof and for emitting said light from a light-emitting end thereof disposed at a forward end of said insertable portion,
an objective lens system disposed at the forward end of said insertable portion for forming an image of an object, and
a solid state image element for photoelectrically converting the image formed by said objective lens system;
a field sequential type light source including,
a lamp for emitting light with a wavelength in a visible range,
a rotary color filter having a rotary frame on which a plurality of openings and a plurality of light shielding portions are provided in a circumferential direction, said plurality of light shielding portions including one light shielding portion which is longer in length than remaining light shielding portions, and a plurality of color transmitting filters which transmit a light with different wavelengths, said plurality of color transmitting filters being respectively mounted on said openings, and
rotating means for driving said rotary color filter, said field sequential type light source to supply to said incident end of said light guide means illumination light which has passed through said color transmitting filters sequentially positioned in an optical path of a light by a drive of said rotating means;
a signal processing means including,
a driver circuit for applying to said solid state imaging element a drive signal used to read out signals therefrom, and
video signal processing means for processing signals which have been read out from said solid state imaging element by application of said drive signal to generate a predetermined video signal; and
a color monitor for displaying said predetermined video signal which has been output from said video signal processing means.

4,878,113

ENDOSCOPE APPARATUS

Kazunari Nakamura, Hachioji, Japan, assignor to Olympus Optical Co., Ltd., Tokyo, Japan

Filed Aug. 10, 1988, Ser. No. 230,540
Claims priority, application Japan, Aug. 11, 1987, 62-200294; Feb. 8, 1988, 63-026839
Int. Cl.[4] A61B *1/04, 1/06*
U.S. Cl. 358—98 **28 Claims**



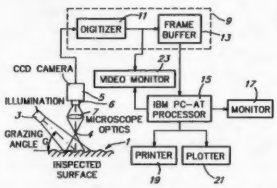
1. An endoscope apparatus comprising:
An endoscope body having an elongate insertable part having an observing window in the tip part and an image forming optical system forming an object image by receiving a light returning from the object and entering through said observing window;
an imaging means imaging the object image formed by said image forming optical system;
a first wavelength range separating means separating the object image into images in a plurality of wavelength ranges in response to a simultaneous type color imaging system;
a second wavelength range separating means separating the object image into images in a plurality of wavelength ranges of a combination different from said first wavelength range separating means, all pixels of said imaging means corresponding to this second wavelength range separating means being included in all pixels of said imaging means corresponding to said first wavelength range separating means;
a signal processing means processing signals for said imaging means in response to the respective wavelength ranges separated by said first wavelength range separating means or said second wavelength range separating means; and
a switching means switching said first wavelength range separating means and said second wavelength range separating means.

4,878,114

METHOD AND APPARATUS FOR ASSESSING SURFACE ROUGHNESS

Van-Minh Huynh, and Francis M. Luk, both of Windsor, Canada, assignors to University of Windsor, Windsor, Canada

Filed May 10, 1988, Ser. No. 192,699
Int. Cl.[4] H04N *7/00, 7/18*
U.S. Cl. 358—106 **11 Claims**



1. A processor based optical system for assessing the roughness of a planar surface of a manufactured product;
said system comprising:
a source of illumination adjustable to illuminate an area of said planar surface;
a video camera, having an input lens and an output means, said camera being mountable above said area such that said input lens is trained on said area to provide an analog output representative of surface characteristics of said area;
frame grabber means, having an input means connected to said output means of said video camera, said frame grabber means digitizing said analog output to provide digital signals corresponding to said analog output;
processor means for performing an analysis of said digital signals and providing a parameter indicative of said roughness;
and further including a video monitor having a first input terminal and a second input terminal;
said first input terminal of said video monitor being connected to an output of said frame grabber means;
said second input terminal being connected to an output of said processor means.

4,878,115

DYNAMIC CORONARY ROADMAPPING

Jonathan L. Elion, Lexington, Ky., assignor to University of Kentucky Research Foundation, Lexington, Ky.

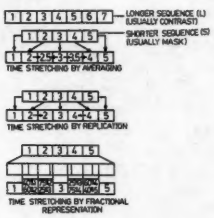
Filed Sep. 25, 1987, Ser. No. 101,074
Int. Cl.[4] H04N *5/32*
U.S. Cl. 358—111 **13 Claims**

1. Method for producing a dynamic coronary artery system roadmap of a patient comprising the steps of:

recording and storing a dynamic visual image of a beating heart for a cardiac cycle so as to create a mask sequence;

injecting a visual contrast medium into the coronary artery system of the patient;

recording and storing a corresponding dynamic visual image



of the beating heart for another cardiac cycle after injecting the contrast medium so as to create a contrast sequence; and

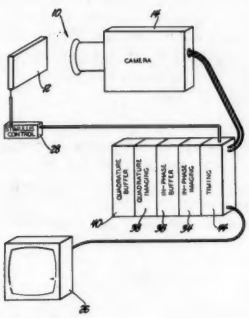
subtracting the corresponding contrast sequence from the mask sequence in order to produce the roadmap sequence of the coronary artery system.

4,878,116

VECTOR LOCK-IN IMAGING SYSTEM

Robert L. Thomas, Huntington Woods; Pao-Kuang Kuo, Troy, and Lawrence D. Favro, Huntington Woods, all of Mich., assignors to Wayne State University, Detroit, Mich.

Filed Jun. 2, 1988, Ser. No. 202,185
Int. Cl.[4] H04N *5/14, 5/30*
U.S. Cl. 358—160 **27 Claims**



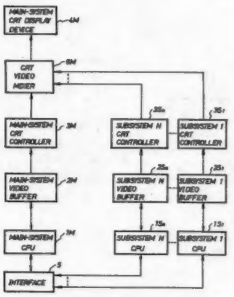
1. An imaging assembly for producing images synchronous with the periodicity of an object field (12), said assembly (10) comprising; reference means for producing a reference signal representing the periodicity of an object field (12), camera means (14) for detecting radiation from the object field (12) producing a video signal of the image comprising a series of pixels representing a frame of the image of the object field (12) and for producing a timing signal for each of said pixels of said frame, processor means (16) for receiving said frame of said video signal and storing said frame in synchronism with said reference signal and for averaging said stored frame with subsequently received frames having said pixels synchronous with said reference signal producing an image signal, and display means (26) for receiving said image signal and displaying the averaged image.

4,878,117

VIDEO SIGNAL MIXING UNIT FOR SIMULTANEOUSLY DISPLAYING VIDEO SIGNALS HAVING DIFFERENT PICTURE ASPECT RATIOS AND RESOLUTIONS

Kimimasa Ikehira, Hadano, Japan; Ming-Chi Wu, Taipei, and Chih-Yuan Liu, Chu-Pei Hsinchu, both of Taiwan, assignors to Ricoh Company, Ltd., Tokyo, Japan and Industrial Technology Research Institute, Taiwan, Taiwan

Filed Feb. 12, 1988, Ser. No. 155,511
Claims priority, application Japan, Feb. 14, 1987, 62-32226
Int. Cl.[4] H04N *5/275*
U.S. Cl. 358—183 **8 Claims**



1. A video signal mixing unit for simultaneously displaying a first video signal and a second video signal transmitted from a first video information source and a second video information source respectively on a single CRT display device,

said first video information source having a first aspect ratio and a first resolution and being controlled by a first pixel clock and a first synchronizing signal, said CRT display device being controlled by said first pixel clock and said first synchronizing signal, said second video information source having a second aspect ratio and a second resolution different from said first resolution and being controlled by a second pixel clock and a second synchronizing signal, said video signal mixing unit comprising:

video buffer means connected to said second video information source for storing said second video signal;

third video pixel clock generating means connected to said first and second video information sources for generating, on the basis of said first and second aspect ratios, said first and second resolutions and a horizontal display time of one scanning line of said CRT display device, a third pixel clock with which said second video information source can be displayed on said CRT display device with said second aspect ratio; and

video signal selecting means connected to said first video information source, and connected to said video buffer means and said third pixel clock generating means for selectively outputting said first video signal sent from said first video information source at a rate of said first pixel clock and said second video signal transferred from said video buffer means at a rate of said third pixel clock.

4,878,119

SYSTEM FOR SYNCHRONIZING INTEGRATION PULSES WITH INTEGRATION SIGNAL IN AN ASYNCHRONOUS RASTER INPUT SCANNER

Thomas R. Beikirch, Webster; James C. Traino, Fairport, and Leon C. Williams, Penfield, all of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Filed Feb. 29, 1988, Ser. No. 161,886
Int. Cl.[4] H04N *1/04*
U.S. Cl. 358—471 **5 Claims**

1. A process for operating a scanning array asynchronously,

said array having at least one row of sensors for scanning an image viewed by the array during an integration period, and at least one shift register for receiving the image signal charges developed by the sensors following the integration period, comprising the steps of:

(a) generating start integration signals in response to a demand for a line of image signals;

(b) continuously generating at a constant clock rate integration shift pulses defining a succession of predetermined integration intervals in synchronism with said start integration signals;

(c) where timing of a new start integration signal changes so that said start integration signals and said shift pulses are out of synchronism with one another, prematurely interrupting the current one of said predetermined integration intervals to start a new one of said predetermined integration intervals; and

(d) resetting said shift pulses so that said shift pulses are in synchronization with said new start integration signal.

4,878,120

SOLID STATE IMAGE SENSOR INCLUDING STATIC INDUCTION TRANSISTOR WITH GATE SURROUNDING SOURCE AND/OR DRAIN

Kazuya Matsumoto, and Tsutomu Nakamura, both of Ina, Japan, assignors to Olympus Optical Co., Ltd., Japan

Filed Mar. 25, 1985, Ser. No. 715,641

Claims priority, application Japan, Mar. 29, 1984, 59-525

The portion of the term of this patent subsequent to May 13, 2003, has been disclaimed.

Int. Cl.[4] H04N *3/15;* H01L *27/14*

U.S. Cl. 358—213.12 **20 Claims**

1. A solid state image pick-up element including a static induction transistor comprising:

a substrate made of a semiconductor material having a high resistivity, or an insulating material;

a semiconductor layer formed on said substrate;

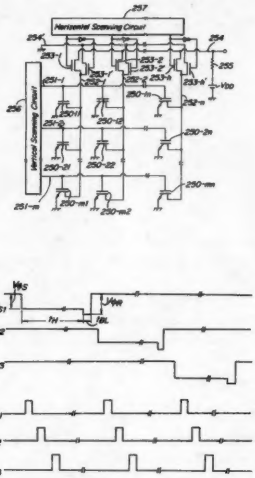
a source region and a drain region formed in a surface of said semiconductor layer; and

gate means, formed in said surface of said semiconductor layer and completely surrounding at least one of said source region and said drain region, for storing photocarriers generated by light excitation, and for controlling a source-drain current flowing in parallel with the surface of said semiconductor layer according to an amount of said stored photocarriers.

12. A solid state image sensor comprising:

a solid state image pick-up element including:

at least one static induction transistor comprising a substrate made of a semiconductor material having a high resistivity, or an insulating material, a semiconductor layer formed on said substrate, a source region and a drain region formed in a surface of said semiconductor layer, and gate means, formed in the surface of said semiconductor layer and completely surrounding at least one of said source region and said drain region, for storing photocarriers generated by light excitation, and for controlling a



source-drain current flowing in parallel with the surface of said semiconductor layer according to an amount of said stored photocarriers;

means for reverse biasing said source region and drain region during a light signal storing period; and

means for reading out a light signal stored in said solid state image pick-up element during a signal reading out period.

4,878,121

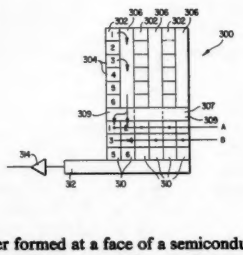
IMAGE SENSOR ARRAY FOR STILL CAMERA IMAGING WITH MULTIPLEXER FOR SEPARATING INTERLACED FIELDS

Jaroslva Hynecek, Richardson, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.

Filed Jul. 9, 1987, Ser. No. 71,447

Int. Cl.[4] H04N *5/335*

U.S. Cl. 358—213.22 **26 Claims**



1. An imager formed at a face of a semiconductor substrate for recording a still image and for translating the still image into a selected television format, comprising:

a frame transfer image array having a plurality of image cells, said image cells accumulating charge in response to

input light and arranged in a plurality of rows and columns, odd numbered ones of said rows constituting a first field and even numbered ones of said rows constituting a second field;

a memory array having a first plurality of memory cells including first cells arranged in first memory columns for storing first field signals contained in said first field and second cells arranged in second memory columns for storing second field signals contained in said second field;

a multiplexer coupled between the image array and the memory array for enabling transfer of groups of n charges in said first field signals to said first memory cells and like groups of n charges in said second field signals to said second memory cells; wherein n is greater than 2 and

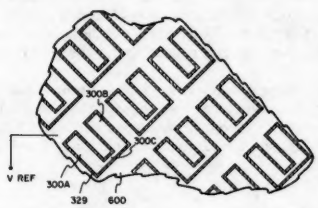
a readout circuit for reading out said first and said second field signals from said first and second memory cells.

4,878,122

LIGHT MODULATOR VIDEO DISPLAY APPARATUS

William E. Glenn, Ft. Lauderdale, Fla., assignor to New York Institute of Technology, Old Westbury, N.Y.

Filed Sep. 4, 1987, Ser. No. 94,382
Int. Cl.[4] H04N *5/74*
U.S. Cl. 358—233 **40 Claims**



1. In a video display apparatus for generating images represented by input video signals, said apparatus including: an array of semiconductor devices having respective electrodes to which charge is applied in accordance with the input video signals; a layer of deformable material disposed over said electrodes; a conductive/reflective layer disposed over said deformable layer; and optical means for converting deformations of the conductive/reflective layer into an image; the improvement comprising:

each of said electrodes of said array having a plurality of spaced conductive regions having respective surfaces of relatively large area in a common plane, the plurality of conductive regions of each of said electrodes being electrically connected in common by at least one conductor having, at most, a relatively small area in said plane;

reference conductive regions having surfaces in said plane between the surfaces of said electrodes and separated therefrom, at least some of said reference conductive regions being electrically connected in common; and

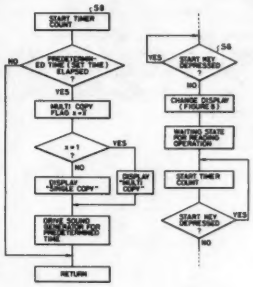
means for applying said input video signals to said electrodes of said array, and for applying at least one reference potential to said reference conductive regions.

4,878,123

IMAGE PROCESSING APPARATUS HAVING IMAGE MEMORY

Shigeo Miura; Masatomo Takahashi; Motoaki Yoshino; Tsunehiro Watanabe, all of Tokyo; Takeshi Toyama, Hiratsuka, and Taketo Takahashi, Tokyo, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 80,074, Jul. 31, 1987, abandoned. This application Dec. 27, 1988, Ser. No. 291,397
Claims priority, application Japan, Aug. 4, 1986, 61-119543[U]; Dec. 27, 1986, 61-312667
Int. Cl.[4] H04N *1/00, 1/04*
U.S. Cl. 358—401 **28 Claims**



1. An image processing apparatus comprising:

processing means for processing image data;

an image memory to store said image data;

one manual switch;

detecting means for detecting a time of depression of said manual switch; and

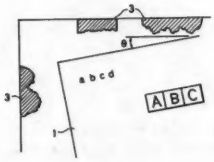
selecting means for selecting whether all of the image data is stored into the image memory or not in accordance with the result of the detection of said detecting means.

4,878,124

IMAGE INCLINATION DETECTING METHOD AND APPARATUS

Shuichi Tsujimoto, and Haruo Asada, both of Yokohama, Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Aug. 2, 1988, Ser. No. 227,119
Claims priority, application Japan, Sep. 25, 1987, 62-241414
Int. Cl.[4] H04N *1/40*
U.S. Cl. 358—443 **20 Claims**



9. An image inclination detecting apparatus for detecting an inclination of the image according to run length codes converted from image data, comprising:

read control means for sequentially reading the run length codes for one scanning line from an image data storage means, and converting the run length codes into edge coordinates, the edge coordinate of each run representing a distance from a start point of the scanning line to a trailing edge of the run;

a first storage portion for storing the edge coordinates from said read control means;

a second storage portion for storing the edge coordinates from said first storage portion;

selecting means for reading the edge coordinates from said first and second storage portions in parallel, and selecting the edge coordinates of runs meeting the predetermined conditions;

edge distance computing means for computing, according to the edge coordinates of the runs selected by said selecting means, distances between the leading edges or between the trailing edges of runs having predetermined positional relations and located on two adjacent scanning lines respectively;

a storage portion for storing computed results from said edge distance computing means; and

an inclination computing portion for computing the inclination of the image with respect to a scanning direction of a reading device according to occurrence frequencies of the computed edge distances.

4,878,125

METHOD AND APPARATUS FOR IMAGE PROCESSING WITH FED-BACK ERROR CORRECTION

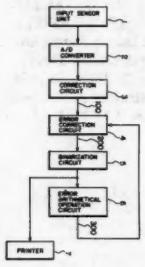
Akihiro Katayama, Kawasaki; Hidefumi Ohsawa, Urawa; Izuru Sunohara, Ichikawa; Hiroshi Hosokawa, and Masahiko Yoshimoto, both of Yokohama, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Dec. 31, 1987, Ser. No. 140,029

Claims priority, application Japan, Jan. 8, 1987, 62-002670; May 21, 1987, 62-122612

Int. Cl.[4] H04A *1/40*

U.S. Cl. 358—443 **18 Claims**



1. An image processing apparatus comprising:

digitizing means for digitizing image data of an objective pixel;

process means for weighting, in order to correct error data generated in digitizing of the image data by said digitizing means, the error data and adding the weighted error data to image data of plural peripheral pixels in a periphery of the objective pixel; and

detection means for detecting an edge direction of at least one of the peripheral pixels from the objective pixel;

wherein said process means changes a ratio of weight of the error data for each peripheral pixel emphasize an edge, in accordance with the detected edge direction.

4,878,126

IMGAE PROCESSING APPARATUS

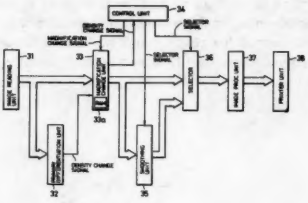
Hiroyuki Ichikawa, Kawasaki, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 256,253, Oct. 6, 1988, abandoned, which is a continuation of Ser. No. 15,926, Feb. 18, 1987, abandoned. This application Apr. 14, 1989, Ser. No. 338,425

Claims priority, application Japan, Feb. 19, 1986, 61-032926; Feb. 19, 1986, 64-32928

Int. Cl.[4] H04N *1/393*

U.S. Cl. 358—451 **19 Claims**



1. An image processing apparatus comprising:

image data input means for inputting image data; and

magnification changing process means for performing, on the basis of a designated magnification, a magnification changing process for the image data input by said image data input means;

wherein said magnification changing process means has a first output mode and a second output mode, and wherein, in said first output mode, said process means performs in a first mode the magnification changing process of the input image data on the basis of the designated magnification to output first magnification-changed image data, and in said second output mode said process means performs in a second mode the magnification changing process for the input image data on the basis of the designated magnification to output second magnification-changed image data, and

wherein said process means is capable outputting the first and second magnification-changed image data which are different from each other with respect to the same input image data and the same designated magnification.

4,878,127

LASER ENGRAVING MACHINE FOR PREPARING ROTARY SCREEN PRINTING SCREENS

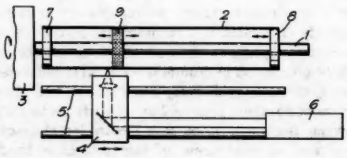
Peter M. Zollman; Brendon T. Pollard, and Andrew D. Birch, all of Surrey, England, assignors to Zed Instruments Ltd., Hersham, England

Filed Nov. 25, 1988, Ser. No. 275,997

Claims priority, application United Kingdom, Nov. 25, 1987, 8727613

Int. Cl.[4] B23K *9/00*; B05C *17/0*; B41C *1/14*

U.S. Cl. 358—299 **10 Claims**



1. A laser engraving machine for engraving rotary printing screens, said laser engraving machine including:

a shaft having a first and second end and a longitudinal axis;

a rotary drive, said rotary drive being connected to said first end of said shaft for, in use, rotating said shaft around its longitudinal axis;

two end ring assemblies, said end ring assemblies being mounted on said shaft and at least one of said end ring assemblies being movable along said shaft, said end ring assemblies being arranged to locate and fix opposite ends of said rotary printing screen to said shaft,

a laser engraving device including a head movable backwards and forwards parallel to said longitudinal axis of said shaft, said laser engraving device, in use, engraving said rotary printing screen mounted on said shaft; and,

a support, said support being movable along said screen with said laser engraving head to provide local support for said screen whereby a part of said screen being engraved by said laser engraving device is supported at a constant predetermined position with respect to said head of said laser engraving device.

4,878,128

VIDEO SIGNAL REPRODUCING APPARATUS

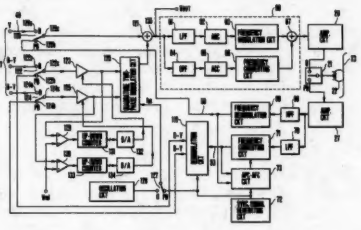
Hiroto Yasumura; Masahide Hirasawa; Minoru Noji, all of Kanagawa; Susumu Kozuki, Tokyo; Koji Takahashi, Kanagawa; Katsuji Yoshimura, Kanagawa, and Tomohiko Sasatani, Kanagawa, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed May 5, 1987, Ser. No. 46,250

Claims priority, application Japan, May 12, 1986, 61-107985; May 26, 1986, 61-120883; Jun. 18, 1986, 61-141813; Jun. 18, 1986, 61-141814; Jun. 18, 1986, 61-141815; Jun. 26, 1986, 61-150207; Apr. 13, 1987, 62-91458; Apr. 13, 1987, 62-91459

Int. Cl.[4] H04N *9/87*

U.S. Cl. 358—315 **5 Claims**



1. A color video signal reproducing apparatus for producing a color video signal, comprising:

(a) image sensing means arranged to pick up an image of an object and to generate, according to information on the image of said object, a first color video signal which includes a first base band color information signal;

(b) reproducing means for reproducing a second color video signal from a record bearing medium;

(c) color information signal forming means for forming a second base band color information signal from said second color video signal reproduced by said reproducing means;

(d) white balance control means for controlling the while balance of said first or second base band color information signal; and

(e) supply means for selectively supplying said first or second base band color information signal to said white balance control means.

4,878,129

METHOD FOR REPRODUCTION OF STORED VIDEO SIGNALS WITH DISK REPRODUCING APPARATUS

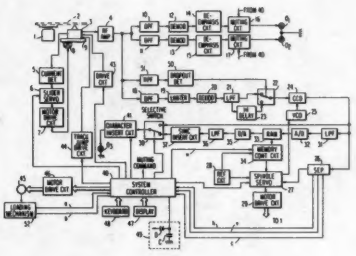
Shigeru Yasuda; Kenichiro Yasukawa; Tsutomu Nakamura, and Kenitiro Asami, all of Saitama, Japan, assignors to Pioneer Electronic Corporation, Tokyo, Japan

Filed Aug. 27, 1987, Ser. No. 89,795

Claims priority, application Japan, Aug. 27, 1986, 61-202316; Aug. 29, 1986, 61-203241; Aug. 29, 1986, 61-203242; Aug. 29, 1986, 61-203244

Int. Cl.[4] H04N *5/76*

U.S. Cl. 358—342 **13 Claims**



1. A method of setting in a pause mode a disk reproducing apparatus having a pickup apparatus for reading a disk and a mechanism for automatically loading a recording disk in the reading position, said method comprising the following steps:

detecting a pause command:

detecting the state of said automatic loading mechanism in response to a pause command:

if it is found that said automatic loading mechanism is not in such a state that said recording disk is loaded in the reading position, operating said automatic loading mechanism in order to load said recording disk in said reading position, and searching for a predetermined position at which information is recorded on said disc;

if it is found in said state detecting step that said automatic loading mechanism is in such a state that said recording disk is loaded in the reading position or following the step of operating said automatic loading mechanism to place said recording disk in the reading position, said searching step being performed only when the reproduction of information from said recording disk is suspended; and

setting the operation of the disk reproducing apparatus in a pause mode when said pickup mechanism is proximate said predetermined position on said recording disk.

4,878,130

REPRODUCTION APPARATUS

Katsuichi Shimizu, Kunitachi; Shunichi Masuda, Tokyo; Toshiaki Yagasaki, Hino, and Hisashi Sakamaki, Yokohama, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 243,232, Sep. 7, 1988, abandoned, which is a continuation of Ser. No. 943,069, Dec. 18, 1986, abandoned, which is a division of Ser. No. 653,072, Sep. 21, 1984, Pat. No. 4,638,368, which is a continuation of Ser. No. 278,563, Jun. 29, 1981, abandoned. This application Mar. 6, 1989, Ser. No. 319,818

Claims priority, application Japan, Jun. 30, 1980, 55-88722; Jun. 30, 1980, 55-88723

Int. Cl.[4] H04H *7/00*

U.S. Cl. 358—400 **13 Claims**

1. An image processing system, comprising:

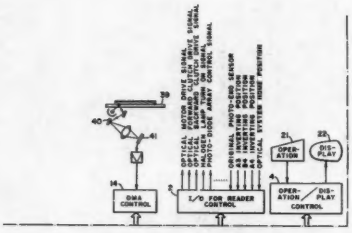
scanning means for optically scanning an original image at a given speed to produce an image signal;

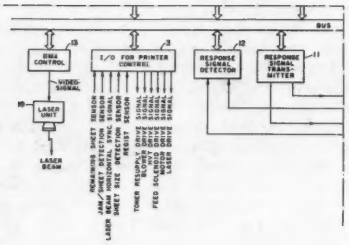
recording means for recording an image on a recording material based on the produced image signal;

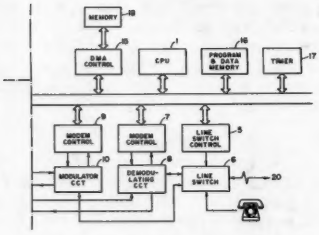
transmitting means for transmitting the image signal to an external apparatus;

memory means for storing at least a page of image signal; and

control means for causing the image signal from said scanning means to be applied to said recording means for image recording without passing through said memory means, and for causing the image signal from said scanning means to be applied through said memory means to said transmitting means for image transmission, wherein said scanning means scans the original image at the same speed both in a case where the image signal is applied to said recording means and in a case where the image signal is applied to said transmitting means.







4,878,131

REPRODUCING APPARATUS

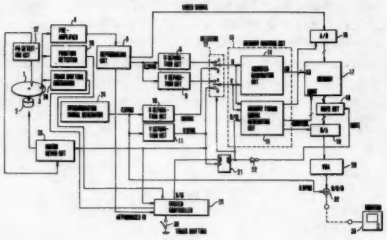
Tsuguhide Sakata, Tokyo; Tomishige Taguchi, Saitama; Norio Kimura; Kunio Tsuruno, both of Tokyo, and Yasutomo Suzuki, Kanagawa, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Aug. 7, 1987, Ser. No. 83,505

Claims priority, application Japan, Aug. 13, 1986, 61-190044

Int. Cl.[4] H04N *5/78*

U.S. Cl. 360—37.1 **22 Claims**



1. An image reproducing apparatus comprising:

(a) reproducing means for reproducing an image signal recorded on a medium;

(b) an image memory;

(c) an address controller for generating an access address control signal for said image memory in response to a synchronizing signal applied thereto;

(d) first synchronizing signal generating means;

(e) second synchronizing signal generating means for generating a synchronizing signal synchronized with the image signal reproduced by said reproducing means; and

(f) change-over means for selecting either of said first synchronizing signal generating means or said second synchronizing signal generating means to apply a signal to said address controller, said change-over means being arranged to apply the synchronizing signal generated by said second generating means to said address controller at the time of writing the image signal into said image memory and to apply the synchronizing signal generated by said first generating means to said address controller at the time of reading the image signal from said image memory.

4,878,132

THERMOMAGNETIC RECORDING METHOD APPLYING POWER MODULATED LASER ON A MAGNETICALLY COUPLED MULTI-LAYER STRUCTURE OF PERPENDICULAR ANISOTROPY MAGNETIC FILM

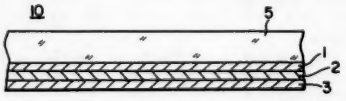
Katsuhisa Aratani, Chiba; Ariyoshi Nakaoki, Tokyo, and Tomiji Tanaka, Saitama, all of Japan, assignors to Sony Corporation, Tokyo, Japan

Filed Apr. 22, 1988, Ser. No. 184,783

Claims priority, application Japan, Apr. 24, 1987, 62-101251; Apr. 27, 1987, 62-103874

Int. Cl.[4] G11B *5/62;* **H01F** *10/00*

U.S. Cl. 360—59 **6 Claims**



1. A thermomagnetic recording method using a thermomagnetic recording medium where first, second and third magnetic

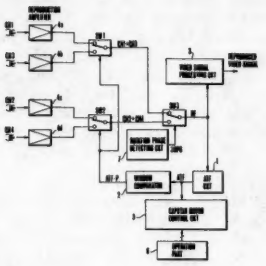
thin films each formed of rare-earth and transition metals are sequentially superposed to form layers in a magnetically coupled manner; heating said thermomagnetic recording medium under a predetermined magnetic field perpendicular to the film plane thereof while selectively modulating, in accordance with data to be recorded, a first heating state at a first temperature T_1 substantially above the Curie point Tc_1 of said first magnetic thin film and adequate to hold the sublattice magnetization of the transition metal of said second magnetic thin film in a predetermined direction, and a second heating state at a second temperature T_2 substantially above said Curie point Tc_1, and adequate to invert the sublattice magnetization of the transition metal of said second magnetic thin film to the reverse of said predetermined direction; and in a cooling step subsequent to said first and second heating states, maintaining the sublattice magnetization of said third magnetic thin fill in a predetermined direction while orienting the sublattice magnetization of said second magnetic thin film to be directionally coincident with that of said third magnetic thin film at a temperature below said first temperature T_1 without directionally inverting the sublattice magnetization of said first magnetic thin film thin representing data by said sublattice magnetization of said first magnetic thin film.

4,878,133

INFORMATION SIGNAL REPRODUCING APPARATUS IN WHICH A PLURALITY OF HEADS ARE SELECTIVELY USED

Hiroyuki Takimoto, Yokohama, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Nov. 13, 1986, Ser. No. 930,704
Claims priority, application Japan, Nov. 15, 1985, 60-254955
Int. Cl.[4] G11B *15/14;* H04N *5/783*
U.S. Cl. 360—64 **12 Claims**



1. An apparatus for reproducing information signals recorded on a record bearing medium on which many tacks are formed in parallel with the magnetizing directions of adjacent tracks differentiated from each other among them, comprising:

(a) a pair of rotary heads which have different azimuth angles and are disposed close to each other;

(b) switching means for selectively outputting two signals reproduced by the pair of rotary heads;

(c) forming means for forming a tracking error signal by using signals output from said switching means;

(d) reproducing means for reproducing said information signals by using signals output from said switching means;

(e) control means for controlling, on the basis of said tracking error signal, the relative positions of said record bearing medium and said pair of rotary heads; and

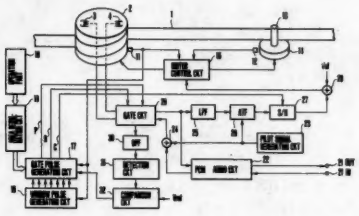
(f) change-over means for changing the state of said switching means on the basis of said tracking error signal.

4,878,134

INFORMATION SIGNAL RECORDING APPARATUS FOR ALIGNING HELICAL SLANT TRACKS

Toshiyuki Masui, Kanagawa; Motokazu Kashida, Tokyo; Koji Takahashi, and Kenichi Nagasawa, both of Kanagawa, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Apr. 22, 1986, Ser. No. 855,174
Claims priority, application Japan, Apr. 25, 1985, 60-090311
Int. Cl.[4] G11B *5/584, 15/467*
U.S. Cl. 360—77.15 **14 Claims**



14. An information signal recording apparatus for recording an information signal on each of a plurality of recording areas extending in a longitudinal direction of a tape-shaped recording medium, comprising:

(a) a rotary head for forming many helical slant tracks and recording said information signal on any of said plurality of recording areas, said rotary head being able to reproduce signals from the recording medium;

(b) manually operable means for designating one of said plurality of recording areas to be used for recording said information signal;

(c) moving means for longitudinally moving said tape-shaped recording medium;

(d) error detection means for forming a tracking error signal indicative of the deviation of the position of said rotary head from helical slant tracks formed on said tape-shaped recording medium;

(e) sampling means arranged to sample said tracking error signal for producing a tracking control signal;

(f) timing control means for controlling a timing at which said sampling means samples said tracking error signal by using signals reproduced by said rotary head; and

(g) tracking control means for controlling said moving means based on said tracking control signal while said rotary head is recording said information signal.

4,878,135

METHOD AND SYSTEM FOR A MAGNETIC DISK DRIVE EMPLOYING A QUADRATIC COMPENSATION FUNCTION FOR DETERMINING AN OFFSET CORRECTION VALUE

Toshihiko Makino, Tokyo, and Makoto Nagasawa, Ibaraki, both of Japan, assignors to NEC Corporation, Tokyo, Japan

Filed Jun. 29, 1987, Ser. No. 67,031
Claims priority, application Japan, Jun. 27, 1986, 61-152047
Int. Cl.[4] G11B *5/55, 5/596*
U.S. Cl. 360—78.04 **37 Claims**

34. A head positioning method for a magnetic disk drive comprising the steps of:

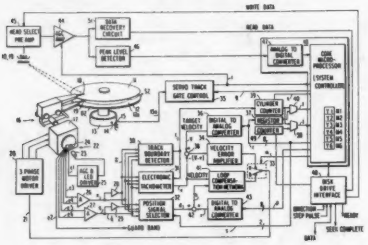
preparing a magnetic disk including at least outer, middle and inner servo tracks on which servo information is recorded, said servo tracks being radially separated by data tracks;

driving a magnetic head in a radial direction of said magnetic disk in response to a positioning signal so as to position said magnetic head on said outer, middle and inner servo tracks;

measuring deviations of said magnetic head from center lines of said outer, middle and inner servo tracks in accordance

with said servo information read out by said magnetic head so as to generate first, second and third deviation values, respectively;

determining an offset correction value for a target track included in said data tracks in accordance with said first,



second and third deviation values and a quadratic compensation function; and

positioning said magnetic head at said target track by use of said coarse positioning signal and said offset correction value.

4,878,136

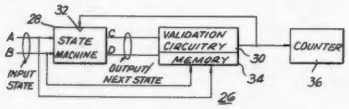
TRACK CROSSING DETECTOR

Raymond E. Sarraf, Westminster, and Daniel R. Zaharris, Longmont, both of Colo., assignors to MiniScribe Corporation, Longmont, Colo.

Filed Sep. 14, 1988, Ser. No. 244,087

Int. Cl.[4] G11B *5/55, 21/08*

U.S. Cl. 360—78.04 13 Claims



11. In a system including a record medium having a plurality of adjacent data tracks and a head movable across said record medium and positionable at a selected one of said tracks, a circuit for detecting a number of tracks crossed by said head during movement across said record medium, said circuit comprising:

signal generating means connected to said head for generating an input signal having first, second, third and fourth ordered input states for every four tracks crossed;

state machine means for outputting an output signal having first, second, third and fourth ordered output states, each said input states being validly associated with a respective one of the output states; and

validation means responsive to said input signal and said output signal for detecting a valid track crossing upon valid association of the present output state with the present input state after a change in the input signal, and producing a clocking signal in the presence of said valid association;

said state machine means being responsive to said clocking signal to update its output state.

4,878,137

DISK FILE DEVICE

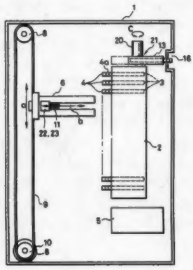
Tohru Yamashita, and Takaharu Takematsu, both of Hyogo, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Feb. 2, 1988, Ser. No. 151,665

Claims priority, application Japan, Feb. 2, 1987, 62-20440; Apr. 3, 1987, 62-81068

Int. Cl.[4] G11B *17/22*

U.S. Cl. 360—98.05 17 Claims



1. A disk file device comprising:

a stocker for accommodating a plurality of cartridges each holding a disk;

a disk recording and reproducing device for writing data on said disk and reading data therefrom;

a carrier for selectively supplying said cartridges from said stocker to said disk recording and reproducing device and for selectively supplying said cartridges from said disk recording and reproducing device to said stocker;

a casing containing said stocker, said disk recording and reproducing device and said carrier with said carrier being located between said stocker and a first portion of said casing, said casing having a cartridge supplying and receiving opening which is formed in a portion of said casing other than said first portion; and

a cartridge displacing mechanism including a cartridge receiving container for receiving a cartridge through said opening, and means for rotating said container so as to supply said received cartridge to said carrier.

4,878,138

RECORDING MEDIUM LOADING MECHANISM FOR GUIDING A RECORDING MEDIUM TO A RECORDING/REPRODUCING POSITION

Shigeru Ando, and Hidemi Sasaki, both of Minato, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Dec. 4, 1987, Ser. No. 128,854

Claims priority, application Japan, Dec. 4, 1986, 61-289823; Dec. 15, 1986, 61-298411

Int. Cl.[4] G11B *17/03*

U.S. Cl. 360—99.02 8 Claims

1. A recording medium loading mechanism for loading a pack containing a recording medium, comprising:

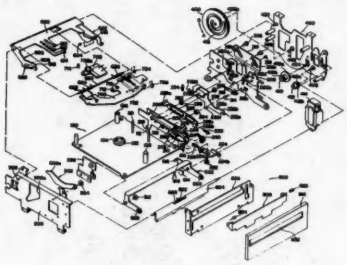
a pack holder provided with a substantially U-shaped guide groove for holding one side portion of the pack and adapted to guide the pack containing the recording medium to a recording or reproducing position;

a main arm disposed rotatably in a main body of a magnetic recording/reproducing apparatus, said main arm provided with a support portion for supporting the other side portion of the pack, and adapted to guide the pack to said recording or reproducing position;

pack holder moving means adapted to initially move said pack holder in the same direction as a first insertion direc-

tion of the pack and subsequently move said pack holder in a second direction which is perpendicular to the first insertion direction when loading the pack; and

main arm height control means adapted to prevent said main arm from being rotated during the movement of said pack



holder in the first insertion direction but allow said main arm to be rotated simultaneously with the movement of said pack holder in the second direction so as to maintain the height of said support portion, relative to said pack holder, constant when loading the pack.

4,878,139

LOADING APPARATUS FOR A MAGNETIC DISK CARTRIDGE

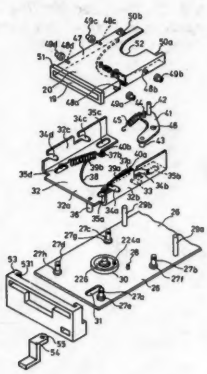
Saburo Hasegawa, Hanamaki, and Eiji Minai, Sagamihara, both of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Kadoma, Japan

Division of Ser. No. 733,910, May 14, 1985, Pat. No. 4,760,476. This application May 9, 1988, Ser. No. 191,969

Claims priority, application Japan, May 15, 1984, 59-96877; May 17, 1984, 59-99003; May 31, 1984, 59-111163; Jun. 12, 1984, 59-121164

Int. Cl.[4] G11B *5/012, 17/028*

U.S. Cl. 360—99.02 **4 Claims**



1. A loading apparatus for a magnetic disk cartridge comprising:

a base plate having thereon disk driving means, driven by a motor thereunder, a pair of stop pins, and a first and second end;

a slider which is horizontally slidably held on said base plate;

a cartridge holder which holds said magnetic disk cartridge therein and is vertically slidably held on said slider, said cartridge holder having a slot to receive said cartridge at a rear end thereof and a pair of guide rollers at a front end thereof for guiding the vertical sliding of a front end part of the cartridge holder along said stop pins at said first end of said base plate;

engaging means for vertically shifting the position of said cartridge holder upon a horizontal sliding of said slider induced by insertion of said cartridge into said cartridge holder; and

slider driving means having a trigger lever whose position is to be shifted by insertion of said cartridge and energizing means for driving said slider at the shifting of position of said trigger lever.

4,878,140

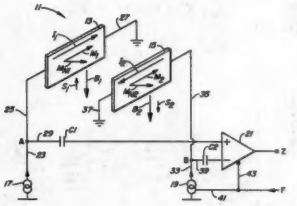
MAGNETO-RESISTIVE SENSOR WITH OPPOSING CURRENTS FOR READING PERPENDICULARLY RECORDED MEDIA

Hardayal S. Gill, Los Altos; Victor W. Hesterman, Los Altos Hills; Glora J. Tarnopolsky, Palo Alto, and Lung T. Tran, San Jose, all of Calif., assignors to Hewlett-Packard Company, Palo Alto, Calif.

Filed Jun. 21, 1988, Ser. No. 209,651

Int. Cl.[4] G11B *5/39*

U.S. Cl. 360—113 **10 Claims**



1. A device comprising:

a first magneto-resistive element having a first magnetization;

a second magneto-resistive element having a second magnetization, said second magnetization being parallel to said first magnetization;

current means for supplying a first current through said first magneto-resistive element and a second current through said second magneto-resistive element, said first and second currents being parallel and directionally opposed, said first and second magneto-resistive elements being spaced so that said first current produces a first bias field orthogonal to said second magnetization at said second magneto-resistive element and so that said second current produces a second bias field orthogonal to said first magnetization at said first magneto-resistive element, said first and second bias fields being parallel and co-directional; and

detector means for detecting differential changes in resistance between said magneto-resistive elements, said detector means being coupled to each of said magneto-resistive elements.

4,878,141

SOLID-PHASE WELDED MAGNETIC HEAD

Masataka Koyama, Yokohama, Japan, assignor to Victor Company of Japan, Ltd., Japan

Division of Ser. No. 802,952, Nov. 27, 1985, abandoned. This application Aug. 5, 1988, Ser. No. 228,679

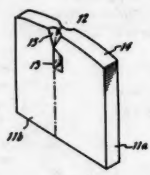
Claims priority, application Japan, Dec. 1, 1984, 59-252829

Int. Cl.[4] G11B *5/235*

U.S. Cl. 360—120 **4 Claims**

1. A magnetic head comprising first and second magnetic core halves held in abutment against each other and a gag-defining spacer interposed therebetween, and having an elongated tape-contact surface extending across said gap-defining

spacer, said gap-defining spacer being formed of a material having substantially the same crystal structure as the material



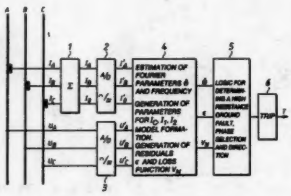
forming said first and second core halves said gap-defining spacer being solid-phase welded to said first and second core halves based on a solid-phase reaction.

4,878,142

HIGH RESISTANCE GROUND FAULT PROTECTION

Sten Bergman, and Stefan Ljung, both of Västerås, Sweden, assignors to ASEA Brown Boveri AB, Västerås, Sweden

Filed Sep. 7, 1988, Ser. No. 241,370
Claims priority, application Sweden, Sep. 16, 1987, 8703580
Int. Cl.[4] H02H *3/26*
U.S. Cl. 361—80 **3 Claims**



1. Protection device for high resistance ground faults in a threephase electric power distribution network, comprising:

means for analog/digital conversion of analog signals representative of at least two phase currents and the zero sequence current of the network;

means for analog/digital conversion of analog signals representative of each of the three phase voltages;

means for estimation of the Fourier parameters of the converted phase current and phase voltage signals;

means for estimation of the frequency of the electric power distribution network;

means for the estimation of the Fourier parameters for the remaining phase current and the negative and positive sequence currents of the electric power distribution network;

means for establishing the Fourier model of the electric power distribution network using the estimated Fourier phase currents, phase voltages, frequency and the negative and positive sequence currents;

means for determining the instantaneous residuals of the electric power distribution network as the difference between the digitized values of said at least two phase currents and the Fourier model values;

means for establishing the instaneous loss function; and

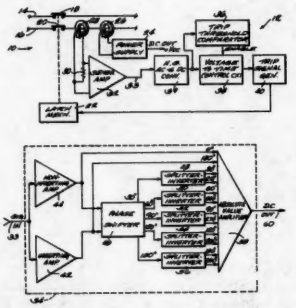
means for generating a trip signal indicating the existence of a high resistance ground fault on any of the phases of the electric power distribution network when the zero sequence current is greater than a lower limit value and simultaneously therewith said loss function has a value greater than a second lower limit value for a time longer than a lower limit time value.

4,878,143

LINE CURRENT TO TIME INTERPOLATOR

Theodore T. Kalal, Wauwatosa, Wis., and Richard Kowitch, Chicago, Ill., assignors to Cooper Power Systems, Inc., Houston, Tex.

Filed Oct. 30, 1987, Ser. No. 115,530
Int. Cl.[4] H02H *3/093*
U.S. Cl. 361—94 **18 Claims**



1. A high speed converter circuit for developing a DC voltage indicative of the magnitude of an applied AC voltage, said converter circuit comprising:

phase shifter means for developing a plurality of replica AC voltages similar to the applied AC voltage and differing in phase from one another; and

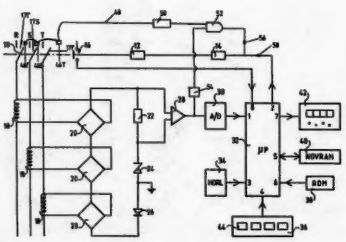
absolute value amplifier means coupled to said phase shifter means for developing an output voltage substantially proportional to the magnitude of the one of said replica AC voltages having greatest magnitude at any instant.

4,878,144

SOLID-STATE TRIP DEVICE OF A MOLDED CASE CIRCUIT BREAKER

Jean-Pierre Nebon, St. Martin-le-Vinoux, France, assignor to Merlin Gerin, France

Filed Sep. 29, 1988, Ser. No. 250,761
Claims priority, application France, Oct. 9, 1987, 87 14084
Int. Cl.[4] H02H *3/08*
U.S. Cl. 361—96 **4 Claims**



1. A solid-state type device of a molded case electrical circuit breaker having a pair of contacts per pole, said contacts being elastically urged into contact in the closed position of the circuit breaker, and an automatic operating mechanism on a fault, capable of causing the separation of said contacts, comprising:

sensors, which generate fault signals as a function of the currents flowing in the conductors protected by the circuit breaker;

a processing unit to which said fault signals are applied to

generate a circuit breaker tripping order, when preset thresholds are exceeded, said order being time-delayed according to the value of the fault signals; and

an arc detector associated with each pair of contacts to detect the light emitted by the arc drawn when the contacts separate, the arcing signals emitted by said arc detectors being applied to said processing unit to bring about instantaneous tripping at the same time when the fault signals exceed said preset thresholds;

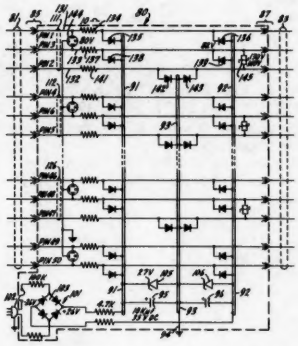
wherein said processing unit comprises an AND circuit to whose inputs the fault signal and the arc signals are respectively applied.

4,878,145

SURGE/TRANSIENT PROTECTOR FOR A PLURALITY OF DATA LINES

Melvin A. Lace, Prospect Height, Ill., assignor to Oneac Corporation, Libertyville, Ill.

Filed Nov. 21, 1988, Ser. No. 273,595
Int. Cl.[4] H02H 3/22
U.S. Cl. 361—118 **20 Claims**



1. A surge/transient protector for protecting a plurality of N data lines, grouped together at a given location, on which lines data are transmitted within a given data voltage range, each data line comprising first and second data conductors and a return conductor, the protector comprising:

N data line segments each including first and second data conductor segments and a return conductor segment;

first and second connector means for connecting each of the N data line segments in series in one of the N data lines;

a positive bus, a negative bus, and a reference bus;

grounding means for connecting the reference bus to a plane of common potential;

first unidirectional coupling means coupling each data conductor segment to the positive bus;

second unidirectional coupling means coupling each data conductor segment to the negative bus;

bi-directional return coupling means coupling each return conductor segment to the reference bus;

a first large transient/surge energy storage device, connected between the positive bus and the reference bus, and having a positive threshold potential slightly larger than one-half the data voltage range;

a second large transient/surge energy storage device, connected between the negative bus and the reference bus, and having a negative threshold potential approximately equal to the positive threshold potential; and

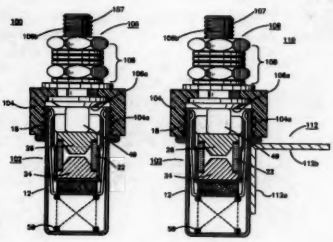
N discharge devices, each connected to the plane of reference potential and to the first and second data conductors in one data line segment, the discharge devices having a breakdown potential much higher than the data voltage range.

4,878,146

LINE PROTECTOR

Richard Kaczmarek, Chicago, Ill., assignor to Reliance Comm/-Tec Corporation, Chicago, Ill.

Filed Apr. 29, 1988, Ser. No. 188,353
Int. Cl.[4] H02H 1/04
U.S. Cl. 361—119 **30 Claims**



1. A line protector for a telephone line comprising:

(a) an enclosure, said enclosure comprising:

(i) a conductive housing having a first end and a second end;

(ii) surge arresting means in said housing; and

(iii) a nonconductive cap in assembled relationship with said housing, said cap enclosing said second end; and

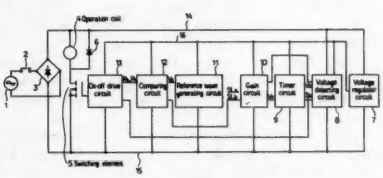
(b) terminal post means having a shank extending outwardly from said nonconductive cap and a head in said cap, said surge arresting means communicating between said head and said housing.

4,878,147

ELECTROMAGNETIC COIL DRIVE DEVICE

Sakan Oyama, Mie, and Koji Omori, Kuwana, both of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Jun. 28, 1988, Ser. No. 212,674
Claims priority, application Japan, Aug. 5, 1987, 62-194443
Int. Cl.[4] H01H 47/04
U.S. Cl. 361—154 **2 Claims**



1. An electromagnetic drive device comprising:

(a) a bus connected to a main power supply;

(b) a constant voltage supply producing a constant reference voltage;

(c) a switch connected in series with an operation coil;

(d) a voltage detecting circuit, connected to the bus, detecting a main power supply voltage and supplying a detection voltage in accordance with the main power supply voltage;

(e) a timer producing an output signal after elapse of a time period set in the timer;

(f) a gain circuit producing a first signal which corresponds to a difference between the reference voltage and the detection voltage;

(g) a control circuit controlling the gain circuit such that closing level signal is produced from the gain circuit before elapse of the time period set in the timer and such

that a holding level signal is produced from the gain circuit after elapse of the time period set in the timer;

(h) a reference wave generating circuit generating a reference wave;

(i) a comparing circuit comparing the reference wave with the closing and holding level signals, the comparing circuit generating closing pulse signals having a first predetermined period and holding pulse signals having a second predetermined period; and

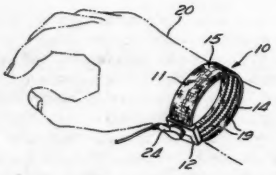
(j) a drive circuit which controls the switch in response to the closing pulse signal and the holding pulse signal.

4,878,148

CROCHETED FABRIC ELASTIC WRIST BRACELET BEARING AN INTERIOR CONDUCTIVE YARN

Roland Hee, Manilla, Philippines, assignor to JES, LP, Newport Beach, Calif.

Filed Jul. 22, 1987, Ser. No. 76,306
Int. Cl.[4] H05F 3/02
U.S. Cl. 361—220 **13 Claims**



1. A strap for establishing electrical contact with a person's body, comprising:

a length of crocheted material, extendable in its longitudinal direction circumferentially about a person's limb, said length of crocheted material comprising:

a fabric body having an upper surface and a lower surface, said fabric body comprising at least one elastic yarn forming a garter oriented in the longitudinal direction to allow the material to stretch, at least two weft yarns, each running generally perpendicular to and disposed on opposite sides of said at least one elastic yarn so as to form the said upper and lower surfaces of said fabric body and at least one warp yarn affixing said weft yarns to said elastic yarn;

an electrically conductive yarn hooked to said lower surface of the fabric body by the warp yarn; and

an electrical connector making electrical connection to the conductive yarn;

wherein the electrically conductive yarn is disposed toward the person's limb for making electrical contact therewith;

wherein the electrically insulating yarns are disposed away from the person's limb for presenting an electrically insulating surface between the person's limb and the electrically conductive yarn.

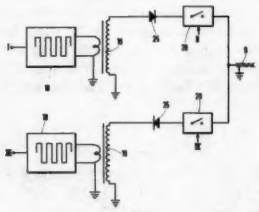
4,878,149

DEVICE FOR GENERATING IONS IN GAS STREAMS

Hans-Henrich Stiehl, and Thomas Sebald, both of Berlin, Fed. Rep. of Germany, assignors to Sorbios Verfahrenstechnische Gerate und GmbH, Berlin, Fed. Rep. of Germany

PCT No. PCT/DE87/00048, § 371 Date Dec. 3, 1987, § 102(e) Date Dec. 3, 1987, PCT Pub. No. WO87/04873, PCT Pub. Date Aug. 13, 1987
PCT Filed Feb. 5, 1987, Ser. No. 138,092
Claims priority, application Fed. Rep. of Germany, Feb. 5, 1987, 3603947
Int. Cl.[4] H01T 23/00; H05F 3/06
U.S. Cl. 361—230 **14 Claims**

1. A device for generating ions in a gas stream with an electrode arrangement exposed to the gas stream and a pulsed high voltage supply, which supplies an alternating sequence of negative and positive pulses with steep edges, characterized in that the electrode arrangement has at least one point discharge electrode and at least one counterelectrode arranged in a fixed



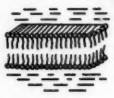
and clearly defined association with one another for the transit of ions therebetween and that the duration of the particular pulse corresponds to the transit time of the ions between the electrodes and the spacing of the pulses is adapted to the speed of the gas stream.

4,878,150

POLARIZABLE MATERIAL HAVING A LIQUID CRYSTAL MICROSTRUCTURE AND ELECTRICAL COMPONENTS PRODUCED THEREFROM

Rhyta S. Rounds, Flemington, N.J., assignor to Colgate-Palmolive Co., Piscataway, N.J.

Filed Feb. 20, 1987, Ser. No. 17,424
Int. Cl.[4] H01G 4/06, 4/08, 9/00
U.S. Cl. 361—311 **56 Claims**



47. A capacitor comprising:

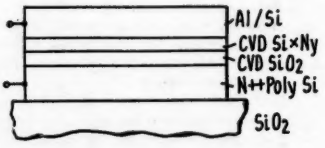
at least one pair of electrodes, and between said electrodes a dielectric material comprising an amphipathic compound principally and a liquid, in the form of a liquid crystal microstructure to provide a high capacitance dielectric material.

4,878,151

ANTI-PARALLEL CAPACITOR

Michael J. Gallichio, New Milford, Conn., assignor to National Semiconductor Corporation, Sunnyvale, Calif.

Filed Apr. 10, 1987, Ser. No. 36,595
Int. Cl.[4] H01G 4/38
U.S. Cl. 361—329 **11 Claims**



1. A capacitor having a low voltage coefficient comprising:

a first capacitor having a first contact, a second contact and a polarity therebetween;

a second capacitor having a first contact, a second contact and a like polarity therebetween;

and wherein said first contact of said first capacitor is connected to said second contact of said second capacitor and said second contact of said first capacitor is connected to the first contact of the second capacitor.

4,878,152

MOUNTING FOR PRINTED CIRCUITS FORMING A HEAT SINK WITH CONTROLLED EXPANSION

Jean-Denis Sauzade, Juan Les Pins, and Manuel L'Hote, Vence, both of France, assignors to Thomson-CSF, Paris, France

Filed Jun. 13, 1988, Ser. No. 205,960

Claims priority, application France, Jun. 16, 1987, 87 08372

Int. Cl.[4] H05K *7/20*; B32B *3/00*

U.S. Cl. 361—386 **6 Claims**

1. A mounting for printed circuits, said mounting forming a heat sink having low heat expansion characteristics, comprising:

(i) a central graphite layer made of compressed graphite sheets having a lateral thermal conductivity greater than 200 W/m.°C. and a density lower than 1.4; said sheets consisting essentially of particles highly oriented in the plane of each sheet; and

(ii) two outer layers, each made of of carbon fibers bound together by a resin matrix, said outer layers displaying a high Young'modulus and sandwiching the central graphite layer.

4,878,153

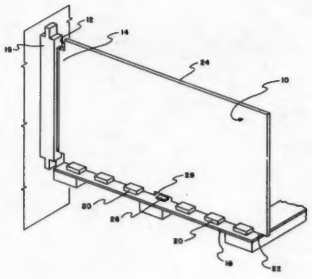
ELECTRONIC SHELF ASSEMBLY

William P. Loris, Bloomingdale, Ill., assignor to Rockwell International Corporation, El Segundo, Calif.

Filed May 23, 1988, Ser. No. 197,373

Int. Cl.[4] H05K *5/02*

U.S. Cl. 361—394 **4 Claims**



1. An electronic shelf assembly for holding a plurality of electronic modules, comprising:

first planar means for supporting the modules and having a plurality of means for guiding the modules along a first edge thereof, said means for guiding projecting out of the plane of said first means for supporting;

means for providing an extension in a predetermined location in at least one of said means for guiding for engaging a recess in at least a first edge of the module, when the module is fully inserted in one of said means for guiding;

second planar means having a plurality of means for guiding the module along a second edge of the module, opposed to said first edge, said means for guiding projecting out of the plane of said second means for supporting, said means for guiding of said second means for supporting being longitudinally aligned with respective ones of the means for guiding of said first means for supporting, said second means for supporting having a predetermined convex contour perpendicular to said means for guiding and means for providing an extension projecting out of the plane of said second means for supporting in a predetermined location in at least one of said means for guiding for engaging a recess in said second edge of the module, when the modules are fully inserted in one of said means for guiding; and

rigid means extending between said first and second means for supporting for interconnecting said first and second means for supporting.

4,878,154

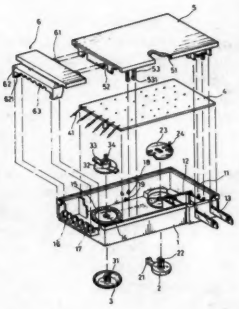
CONTROL BODY FOR CHRISTMAS TREE

Kwang N. Wang, 2F, No. 1 Lane 76, An-Ho Rd., Taipei, Taiwan

Filed Dec. 22, 1988, Ser. No. 288,679

Int. Cl.[4] H05K *1/14*

U.S. Cl. 361—395 **1 Claim**



1. A control body for a Christmas tree comprising:

a circuit board having a rheostat;

a housing receiving therein said circuit board and including:

a plug seat mounting thereon two conducting pieces;

three engaging sets each of which includes two opposite higher triangular pieces and a lower triangular piece;

a base plate extended from one end of said housing and forming thereon a plurality of electric wire guiding grooves each of which is provided with three spaced radially arcuate platelets; and an annulus formed on an inner wall of said housing and regularly forming thereon a knurled surface;

a cover plate having three pairs of barbed legs each pair of which is capable of firmly engaging with said higher and lower triangular piece of said each set;

an end cover connected to said cover plate, and having a covering portion capable of being securely fixed to said base plate and providing thereunder a plurality of guiding grooves respectively corresponding to said electric wire guiding grooves;

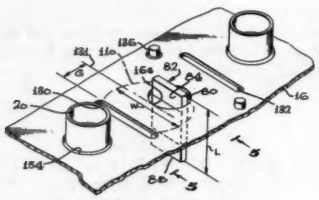
a switch disk engaging with said housing for adjusting a contacting relationship between said circuit board and said conducting pieces; a coupling piece received in said housing, connected to said rheostat and including two opposite engaging pieces capable of steppedly and diametrically engaging on said knurled surface; and a rotating disk positioned outside of said housing and capable of firmly engaging with said coupling piece.

4,878,155

HIGH SPEED DISCRETE WIRE PIN PANEL ASSEMBLY WITH EMBEDDED CAPACITORS

Larry R. Conley, 11146 Blue Allium, Fountain Valley, Calif. 92709

Continuation-in-part of Ser. No. 100,937, Sep. 25, 1987, abandoned. This application Sep. 30, 1988, Ser. No. 252,260
Int. Cl.[4] H05K *1/18*
U.S. Cl. 361—401 12 Claims



1. A high speed logic panel comprising:
a board member of insulative material having upper and lower faces;
voltage and ground conductive layers, each lying on and covering a majority of one of said board member faces and forming conductive planes on corresponding board faces;
said board member and conductive planes having a multiplicity of aligned capacitor-receiving through holes;
a multiplicity of elongated leadless decoupling capacitors each having an elongated body with a middle and opposite ends and whose outside is insulative at said middle and which has electrically conductive layers at said ends forming capacitor terminals, each capacitor having a capacitance between said terminals, each capacitor lying in one of said holes with said terminals lying respectively adjacent to said voltage and ground conductive layers;
a quantity of solder extending between each capacitor terminal and an adjacent portion of a corresponding one of said conductive planes;
each capacitor includes two groups of interfitting conductive films extending in cross planes perpendicular to said conductive planes and merging with said terminals, and each quantity of solder forms a conductive path extending between a capacitor terminal and a conductive plane lying primarily in a corresponding one of said conductive planes.

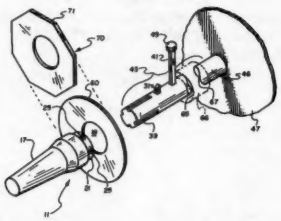
4,878,156

QUICK RELEASE FOCUSING HANDLE FOR SURGICAL LIGHTS

Leonard L. Hallings, Rochester, and Richard W. Steiner, Newark, both of N.Y., assignors to MDT Corporation, Rochester, N.Y.

Filed Mar. 6, 1989, Ser. No. 319,048
Int. Cl.[4] F21V *33/00*
U.S. Cl. 362—109 14 Claims

1. In a surgical light of the type in which a light source is contained within a housing in cooperable association with a focusing mechanism which includes a rotatable focusing shaft, said shaft extending from said housing, thereby to provide an exposed shaft portion with a distal shaft end, said exposed shaft portion constituting means for operating said focusing mechanism by selective alternative clockwise or counterclockwise rotation, the improvement which comprises:
a drive post segment, including said distal end, in operable association with
a handle element with an external contact surface configurated for grasping by a hand and a substantially hollow interior cavity with an entry at a first end of said handle element, said entry and cavity being configurated to receive and contain, respectively, said drive post segment, said handle element including:
first coupling structure adapted to connect to second coupling structure associated with said drive post segment, one of said first or second coupling structure including finger actuatable release structure constituting means for disconnecting said first and second coupling structures to thereby disconnect said handle element from said drive post segment;



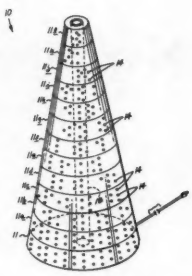
an internal drive surface configurated to engage a corresponding reaction surface of said drive post segment, said drive and reaction surfaces cooperatively constituting means for transferring rotational movement of said handle element to said drive post segment; and
a shield element circumscribing said entry between said contact surface and said release structure constituting means for isolating said release structure from a hand grasping said contact surface.

4,878,157

FIBER OPTIC CHRISTMAS TREE

Paul H. Koch, c/o Menhume Helicopters, 3222 Kuiho Hwy., Lihue, Hi. 96766

Filed Nov. 21, 1988, Ser. No. 274,345
Int. Cl.[4] F21P *1/02*
U.S. Cl. 362—123 4 Claims



1. A fiber optic Christmas tree comprising,
a conical Christmas tree including a plurality of conical segments, each segment formed with an axially aligned cylindrical central chamber, and
a plurality of light conducting conduits radially directed from said central chamber to an exterior surface of each segment, and
a light source positionable axially of said Christmas tree when said segments are stacked upon one another, and
a plurality of fiber optic members selectively positionable within said conduits to visually direct light from said light source through said fiber optic members, and
wherein the fiber optic members are formed in a variety of colors, and

wherein a cap socket is positionable on an uppermost segment of the Christmas tree when the segments are stacked upon one another, wherein the cap socket includes an electrical socket for electrical association of the light source with a base segment wherein said base segment is positionable at the lowermost terminal end of the segments when stacked, and

wherein a transparent cylindrical diffuser tube is positionable through the axial chamber of each of the plurality of segments to effect diffusion of the light source and provide stability to the stack of segments, and

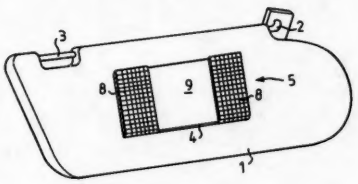
wherein each conical segment is defined by a parallel upper and lower surface, and wherein each upper surface includes at lease one arcuate tab directed upwardly and orthogonally relative to the upper surface, and each lower surface contains a cylindrical groove to slidingly receive a tab from a lowermost segment.

4,878,158

SUN VISOR ASSEMBLY FOR MOTOR VEHICLES, WITH AN ILLUMINATED REAR-VIEW MIRROR

E. Gunnar Svensson, Malung, Sweden, assignor to Autopart Sweden AB, Malung, Sweden

Filed Oct. 18, 1988, Ser. No. 259,148
Claims priority, application Sweden, Oct. 28, 1987, 8704199
Int. Cl.[4] F21V *33/00*
U.S. Cl. 362—140 **5 Claims**



1. A sun visor assembly for a vehicle comprising an elongated visor body and a mirror and lighting assembly attached to the visor body, said mirror comprising a mirror plate the back side of which is glued directly onto the visor body, said lighting assembly comprising a lamp-holder with electrical contact means, said lighting assembly being glued directly onto the front surface of the mirror plate so as to hold an associated lamp in front of the front surface of the mirror plate, thereby making the mirror plate serve as a reflector for the lamp.

4,878,159

FLUORESCENT LAMP HAVING REMOVABLE JACKET

Ronald G. Blaisdell, Saugus, and Harold L. Hough, Beverly, both of Mass., assignors to GTE Products Corporation, Danvers, Mass.

Filed Oct. 11, 1988, Ser. No. 255,306
Int. Cl.[4] F21S *3/00*
U.S. Cl. 362—222 **8 Claims**

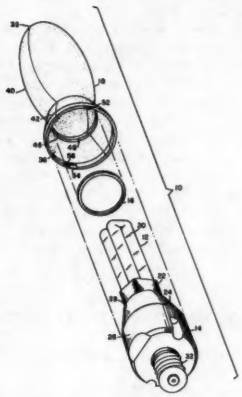
1. A fluorescent lamp unit comprising:

a fluorescent lamp;

an adapter including a housing having an upper surface, a pair of lugs protruding from said housing, and a ballast contained within said housing electrically connected to said fluorescent lamp;

a compressible gasket member located on said upper surface of said adapter; and

a detachable jacket member enclosing said fluorescent lamp and having an inner surface, said jacket member having a ledge protruding inwardly from said inner surface and extending radially around said jacket member; said ledge having a bearing surface for contacting said compressible gasket member, said jacket member further including a pair of diametrically opposed grooves formed in the inner



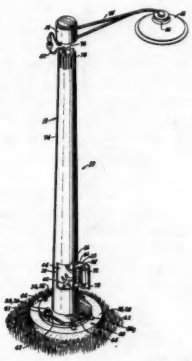
surface of said jacket member and positioned to engage with said pair of lugs on said housing of said adapter.

4,878,160

OUTDOOR LIGHTPOLE

George W. Reneau, 6130 E. Orange St., Indianapolis, Ind. 46203, and George M. Reneau, 7845 Cullen Dr., Indianapolis, Ind. 46219

Filed Mar. 11, 1988, Ser. No. 167,095
Int. Cl.[4] F21V *21/26*
U.S. Cl. 362—269 **12 Claims**



1. A servicepole assembly, for mounting a servicepole on a mounting foundation pad, comprising;

a fixed support means, with first holding means which hold the fixed support means to the pad and supported thereby;

a secondary support means;

hinge means rotatably connecting the fixed support means and the secondary support means;

a servicepole;

connection means for fixedly connecting the servicepole to the secondary support means;

second holding means for releasably holding the servicepole and the secondary support means to the fixed support means, and in a specific relative orientation, but releasable for accommodating relative rotation of the fixed support

means and the secondary support means, to thereby permit downward swinging of the servicepole's upper end to facilitate service in a region adjacent the ground, to whatever are components carried relatively adjacent the upper end of the servicepole,

in which the second holding means includes a plurality of upstanding connector members for fixed connection to the fixed support means, and the secondary support means is provided with openings through which the connector members respectively extend, and the said openings of the secondary support means are provided to be of elongated nature with reference to the size of the connector members in a direction perpendicular to the direction of the axis of the hinge means, thereby accommodating the rotation of the servicepole for its said servicing, and

in which the elongation of the openings of the secondary support means is such that the openings extend fully to open at the outer edge of the secondary support means.

4,878,161

PROJECTOR-TYPE HEAD LAMP ASSEMBLY FOR VEHICLES

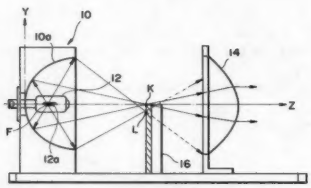
Yutaka Nakata, Isehara, Japan, assignor to Ichikoh Industries, Ltd., Tokyo, Japan

Filed Mar. 20, 1989, Ser. No. 326,076

Claims priority, application Japan, Mar. 22, 1988, 63-65638; Mar. 15, 1989, 1-60790

Int. Cl.[4] F21V *7/00*

U.S. Cl. 362—305 **8 Claims**



1. A projector-type head lamp assembly for use with vehicles, comprising a reflector having an inner reflection surface disposed about an optical axis, a lamp bulb having at least one axial coil filament disposed on the axis of the reflector, a convex lens disposed in front of the reflector, and a shade disposed between the reflector and convex lens and which has provided near the focus of the convex lens an optically effective edge which provides a light-dark boundary by blocking a part of the light rays projected from the lamp bulb and reflected by the inner reflection surface, wherein

(a) said coil axis is arranged parallelly to said optical axis of said reflector and said reflection surface is composed of a plurality of reflection surface areas of different reflection properties;

(b) said reflection surface area includes a first reflection area extended horizontally from the optical axis including the apex of said inner reflection surface, a second reflection surface area having at least two surface areas adjoining said first surface area at the top and bottom, respectively, of said first surface area and which are extended horizontally, and a third reflection surface area having at least two reflection areas adjoining said second reflection surface areas, respectively;

(c) said first to the third surface areas are formed from numerous fine surface elements contiguous smoothly to each other, said fine surface elements belonging to each of said surface areas being so oriented in different orientations, respectively, as predetermined that the incident light rays from said lamp bulb are converged to different points in the vicinity of the edge of said shade; and

(d) the orientations of said fine surface elements belonging to said first surface area are so determined that the incident light rays from said lamp bulb are converged near the center of the top end of the edge of said shade, the orientations of said fine surface elements belonging to said second surface areas being so determined that the incident light rays from said lamp bulb are converged to a horizontal zone including up to a position spaced horizontally a predetermined distance from the center of the top end of the edge of said shade, and the orientations of said fine surface elements belonging to said third surface areas being so determined, correspondingly to the orientations of said fine surface elements belonging to said first reflection surface area, that the incident light rays from said lamp bulb are converged into a vertical zone including up to a position extended downward from near the center of the top end of the edge of said shade.

4,878,162

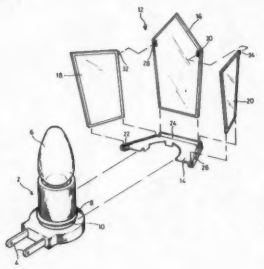
NIGHT LIGHT LAMP-SHADE

Arthur S. Wu, No. 11, Alley 8, Shiway Lane, Chung Chang Rd., Shin Ten City, Taipei Shien, Taiwan

Filed Jan. 12, 1989, Ser. No. 295,991

Int. Cl.[4] F21V *1/06*

U.S. Cl. 362—352 **1 Claim**



1. A night light lamp-shade comprising a main body having a pair of plugs extended and connecting with a light thereon and a lamp-shade, characterized in that the lamp-shade consists of a base, a front plate and two side plates, wherein the base is trapezoidal and provided with channels at three sides while a fourth (long) side is formed with a semi-circular aperture and mounted with three symmetrical contact members; the three plates are engaged with the channels of the base and connected with each other in use of the tabs mounted on the side plates and snap holes formed on the front plate.

4,878,163

PULSE WIDTH MODULATED INVERTER WITH HIGH-TO-LOW FREQUENCY OUTPUT CONVERTER

Ikuo Yamato; Norikazu Tokunaga; Yasuo Matsuda, and Hisao Amano, all of Hitachi, Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Jun. 3, 1988, Ser. No. 201,755

Claims priority, application Japan, Jun. 5, 1987, 62-139800; Jun. 5, 1987, 62-139801

Int. Cl.[4] H02M *5/27*

U.S. Cl. 363—8 **6 Claims**

1. A power conversion system comprising:

a DC power supply for supplying a predetermined DC voltage;

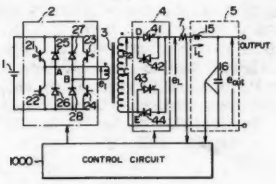
an inverter including a plurality of switching elements connected in bridge connection and a plurality of diodes connected in parallel to the switching elements for converting the DC voltage of said DC power supply into a predetermined high-frequency AC voltage;

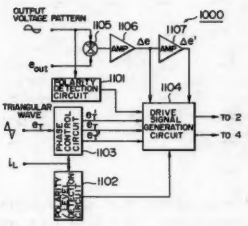
a transformer including a primary winding supplied with the

high-frequency AC voltage generated in said inverter and a secondary winding for generating a predetermined high-frequency high voltage;

a frequency changing circuit connected to the secondary winding of said transformer and including a plurality of switching elements coupled in reverse parallel for converting the high-frequency high voltage generated in the secondary winding of said transformer into a predetermined low-frequency high voltage;

a filter including a reactor and a capacitor for converting the low-frequency high voltage of said frequency changing circuit into a predetermined sinusoidal wave voltage;





a detector for at least detecting the current flowing in the filter;

first means for enabling a starting time of a short-circuiting prevention period of said inverter;

second means for enabling a commutation period of said frequency changing circuit; and

a control circuit means for generating a control signal and applying said control signal to said first and second means, said first and second means being responsive to said control signal for at least causing said commutation period of said frequency changing circuit to overlap said short-circuiting prevention period of said inverter.

4,878,164

POWER SUPPLY GRADUALLY DEVELOPING AN OUTPUT VOLTAGE WHEN SWITCHED ON

Alessandro Colombo, Monza, Italy, assignor to SGS- Thomson Microelectronics s.r.l., Catania, Italy

Filed Jan. 31, 1989, Ser. No. 304,796

Claims priority, application Italy, Feb. 4, 1988, 83605 /88

Int. Cl.[4] H02M *7/517, 7/5375*

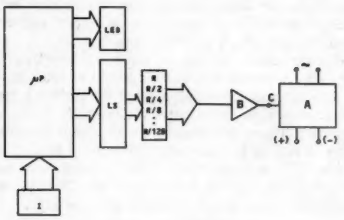
U.S. Cl. 363—49 **1 Claim**

1. A power supply wherein the output voltage thereof is set by applying a control voltage to a control terminal of said power supply and capable of gradually developing said output voltage, on switching-on of the power supply, from zero to a preset value,

characterized by comprising

a microprocessing having a plurality of input and output logic gates;

at least a low-to-high type level shifter circuit driven by said microprocessor through at least one of said output logic gates thereof and having output terminals connected to a network of load resistors of scaled values: the highest value resistor being connected to the most significative bit output terminal and the lowest value resistor being connected to the less significative bit output terminal of said level shifter circuit, an analog voltage signal corresponding to a digital value presented by said microprocessor at said logic gate thereof being produced across two output terminals of said network of load resistors;



an analog buffer driven by said analog voltage signal and having an output terminal connected to said control terminal of said power supply;

selection means, connected to an input logic gate of said microprocessor, capable of determining a certain ramp for the rising of the output voltage delivered by said power supply from zero to a preset value on switching-on of the power supply.

4,878,165

CONTROL SYSTEM WITH IMPROVED ROBUSTNESS TO DISTURBANCES

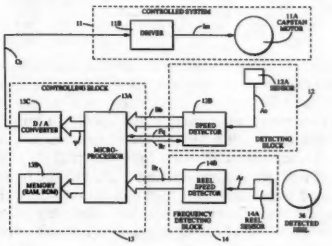
Makoto Gotou, Nishinomiya, and Shigeaki Matsubayashi, Sakai, both of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Mar. 27, 1987, Ser. No. 30,610

Claims priority, application Japan, Mar. 31, 1986, 61-73504; Mar. 31, 1986, 61-73575; Apr. 25, 1986, 61-97166

Int. Cl.[4] G05B *13/02;* **G11B** *15/32*

U.S. Cl. 364—158 **24 Claims**



1. A control system comprising:

a first detecting means for detecting a controlled variable of a controlled system periodically at intervals of a detection period and for producing at each detection timing a first detected signal indicative of each detected controlled variable;

a second detecting means for detecting a period of a periodic fluctuation of a disturbance source disturbing the controlled system and for producing a second detected signal proportional to the period of the periodic fluctuation;

an error value producing means for producing from the first detected signal an error value indicative of an error of the controlled variable;

a memory have stored therein a plurality of stored values;

a renewing means for mixing the error value with a composite value which is produced from at least one of the plurality of stored values for obtaining a renewing value and for renewing each of the plurality of stored values sequentially and periodically by the renewing value at intervals of a renewing period proportional to the detection period of said first detecting means;

a composing means for producing the composite value at each renewing timing of said renewing means from at least one of the plurality of stored vales which have been previously renewed by at least L renewing periods, wherein L is an integer which is at least equal to 2;

an output means for mixing the error value with the composite value at a predetermined mixing ratio to obtain a control signal and for supplying the controlled system with the control signal to control the controlled variable; and

a changing means responsive to the second detected signal for controlling the composing means so as to change the value of L in proportion to the second detected signal thereby reducing an influence of the fluctuation of the disturbance source on the controlled variable.

4,878,166

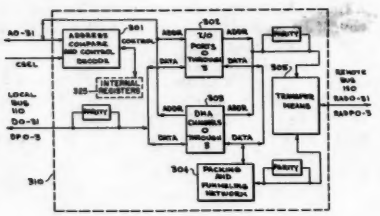
DIRECT MEMORY ACCESS APPARATUS AND METHODS FOR TRANSFERRING DATA BETWEEN BUSES HAVING DIFFERENT PERFORMANCE CHARACTERISTICS

William M. Johnson, San Jose; Timothy A. Olson, Sunnyvale; Drew J. Dutton, Santa Monica; Sherman Lee, Palos Verdes Estates, and David W. Stoenner, El Toro, all of Calif., assignors to Advanced Micro Devices, Inc., Sunnyvale, Calif.

Filed Dec. 15, 1987, Ser. No. 133,094

Int. Cl.[4] G06F *13/12*

U.S. Cl. 364—200 **44 Claims**



1. Direct memory access means having a plurality of operating states each indicated by a status signal for transferring data to and from a first bus to which a first set of devices, including at least one central processing unit ("CPU"), is attached, and a second bus to which a second set of devices, having performance characteristics differing from said first set of devices, is attached, wherein the transferring of data to and from said first and second buses facilitates communication between said first and second set of devices without adversely affecting the performance of said first set of devices and said second set of devices, comprising:

(a) access means, operating independent of CPU intervention, coupled to said first bus and to said second bus, including at least one direct memory access channel means for determining data transfer addresses, wherein said direct memory access channel means has said plurality of operating states each of which is indicated by a status signal, and further wherein said access means is utilized for channelling direct memory access transfers from said first bus to said second bus and from said second bus to said first bus;

(b) means for interconnecting said first bus to said access means;

(c) means for interconnecting said second bus to said access means; and

(d) a set of internal registers included within said access means, coupled to and receiving inputs from said first bus, wherein said set of internal registers are accessed by said direct memory access channel means for determining said data transfer addresses, where the contents of the set of internal registers are used for controlling and maintaining a given direct memory access channel operating state and the status indication associated therewith.

4,878,167

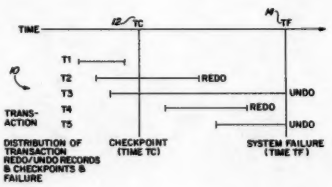
METHOD FOR MANAGING REUSE OF HARD LOG SPACE BY MAPPING LOG DATA DURING STATE CHANGES AND DISCARDING THE LOG DATA

Kenneth M. Kapulka, San Jose; Holly A. Rader, Morgan Hill, and Jimmy P. Strickland, Saratoga, all of Calif., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Jun. 30, 1986, Ser. No. 880,387

Int. Cl.[4] G06F *15/00, 11/30*

U.S. Cl. 364—200 **5 Claims**



4. A method, implemented on a digital computer system, for managing the reuse of space on a hard log stored on memory means in said computer system in support of forward resource recovery (FIG. 4) in a transaction-oriented system in which concurrently executing, failure-independent processes share a common hard log and one or more resources, and further wherein each transaction utilizes begin, commit, abort, redo-/undo operations to bound the transaction, and in which redos ensure transaction return to the most recent commit point and undos ensure return to the transaction begin point, comprising the steps of:

(a) initiating the recording of log data on said memory means with a log manager in said computer system in a partitioned fashion by a unit of recovery (UR) using a begin marker on a transaction recovery stream (TRS) resident on the hard log (FIG. 8);

(b) using said log manager to classify and then to write and then writing to the TRS log data into subsets according to the COMMIT, ABORT, REDO, UNDO function of their role in recovery (FIGS. 6, 8, 12);

(c) upon a UR state change responsive to a commit operation, used said log manager to perform a one-to-n mapping of all log data in the REDO subset of the UR partition from the TRS into predeterminedly associated resource recovery streams (RRSs), and upon a UR state change responsive to an abort operation, to perform a one-to-n mapping of log data in the UNDO subset of the UR partition from the TRS into predeterminedly associated RRSs (FIGS. 9, 15, 16 for commit and FIGS. 10, 13, 14 for abort); and

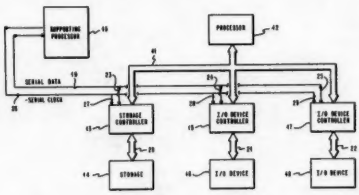
(d) at the termination (END) of the UR state changes utilizing the RRSs, using said log manager to discard all log data identified on the hard log as belonging to the given UR partition from the TRS rendering space occupied by said discarded log data on said hard log amenable to reuse (FIGS. 11, 17-24).

4,878,168

BIRIRECTIONAL SERIAL TEST BUS DEVICE ADAPTED FOR CONTROL PROCESSING UNIT USING PARALLEL INFORMATION TRANSFER BUS

William M. Johnson, Leander, and Charles G. Wright, Round Rock, both of Tex., assignors to International Business Machines Corporation, Armonk, N.Y.

Continuation of Ser. No. 595,159, Mar. 30, 1984, abandoned. This application Oct. 29, 1986, Ser. No. 924,118
Int. Cl.[4] G06F *11/30, 13/40;* G11C *19/00*
U.S. Cl. 364—200 19 Claims



1. In a data processing system comprising a central processor providing information, a main storage unit, a storage controller connecting said processor to said storage unit by a parallel bus between said processor and controller and between said controller and main storage unit, for parallel transfer of addresses and data information, means for testing said controller and storage unit comprising:

a bidirectional serial line connected to said storage controller,

test support means connected to said bidirectional serial line for providing test address and data information to and receiving test address and data information from said bidirectional serial line and

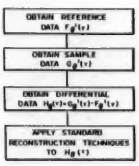
means in said storage controller for converting said test address and data information from said bidirectional serial line for a parallel transfer to said main storage unit wherein said test address is provided to access the storage unit and individual storage locations within the main storage unit through the storage controller and the test data is provided to and received from the main storage unit and the storage controller for testing said main storage unit and said storage controller by said test support means.

4,878,169

REGION OF INTEREST TOMOGRAPHY EMPLOYING A DIFFERENTIAL SCANNING TECHNIQUE

Paul D. Toner, and Terence Taylor, Both of Deep River, Canada, assignors to Atomic Energy of Canada Limited-Energie Atomique Du Canada Limitee, Ottawa, Canada

Filed Jun. 29, 1988, Ser. No. 213,131
Claims priority, application Canada, Sep. 11, 1987, 546640
Int. Cl.[4] G06F *15/42;* G05B *6/03;* G01R *23/04*
U.S. Cl. 364—413.19 12 Claims


OBTAIN REFERENCE DATA $F_R'(t)$
OBTAIN SAMPLE DATA $G_R'(t)$
OBTAIN DIFFERENTIAL DATA $H_R'(t)=G_R'(t)-F_R'(t)$
APPLY STANDARD RECONSTRUCTION TECHNIQUES TO $H_R'(t)$

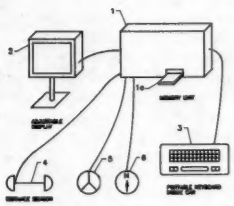
1. A method of generating a computed tomographic image of a region of interest of a sample comprising obtaining reference data only for the region-of-interest of a complete reference object that is a relatively good match to the sample outside the region-of-interest and has a known attenuation distribution inside the region-of-interest, scanning only the region-of-interest of the sample to obtain sample data, subtracting the reference data for the region of interest from the sample data to obtain differential data, and reconstructing from the differential data a differential image of the region of interest.

4,878,170

VEHICLE NAVIGATION SYSTEM

Elisha I. Zeevi, 475 Cumulus Ave., 16, Sunnyvale, Calif. 94087

Continuation-in-part of Ser. No. 27,292, Mar. 17, 1987, abandoned. This application Mar. 17, 1988, Ser. No. 169,645
Int. Cl.[4] G06F *15/50*
U.S. Cl. 364—449 36 Claims



1. A vehicle navigation system comprising:

means for storing map data representing a road network, said data comprising information about landmarks, said information comprising landmark identifiers, landmark location and landmark characteristics of said landmarks in said road network, map distances between said landmarks, and path characteristics between adjacent landmarks;

means for receiving start location data indicating vehicle start location;

means for receiving destination data indicating a desired destination;

means coupled to said map data storing means for establishing a route comprising sequence data, said sequence data indicating a sequence of landmark identifiers;

first processing means coupled to said route establishing means for receiving said sequence data and for computing sequence action data, said sequence action data comprising computed lineal distances between landmarks and status data related to an approached landmark;

distance measuring means for measuring distance travelled by said vehicle to provide measured distance data;

means for detecting vehicle movement in a distance window only around said approached landmark to provide movement data indicative of change in motion of said vehicle;

second processing means coupled at least to said first processing means, to said distance measuring means, and to said vehicle movement detecting means for receiving said movement data, said distance data and said sequence action data, for supplying output data indicative of current location or expected actions in sequence for aiding a driver of the vehicle to adhere to the route; and

output means for supplying the output data in a form discernible by the driver.

4,878,171

NUMERICAL CONTROL METHOD FOR MACHINING AN ARC ON THE CURVED SURFACE OF A CYLINDER USING INTERPOLATION OF LINEAR AND ANGULAR DATA

Nobuyuki Kiya, and Kimio Maeda, both of Hachioji, Japan, assignors to Fanuc Ltd., Minamitsuru, Japan

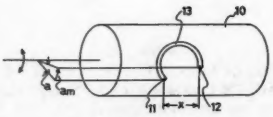
PCT No. PCT/JP87/00956, § 371 Date Jun. 29, 1988, § 102(e) Date Jun. 29, 1988, PCT Pub. No. WO88/04799, PCT Pub. Date Jun. 30, 1988

PCT Filed Dec. 9, 1987, Ser. No. 221,247

Claims priority, application Japan, Dec. 18, 1986, 61-300032

Int. Cl.[4] G05B *19/41*

U.S. Cl. 364—474.29 **8 Claims**



1. A numerical control method in which controls around a rotation axis and along a linear axis of a machine tool are simultaneously performed by a numerical control unit which operates in accordance with a machining program, so that a circular arc is formed on a cylindrical surface of a cylindrical workpiece, comprising the steps of:

(a) calculating a distance interval, in a circumferential direction of the workpiece, between a start point and an end point of a circular arc to be formed on the basis of a moving command value for the rotation axis, the moving command value being indicative of an angular interval between the start and end points of the circular arc in the circumferential direction of the workpiece and represented by a unit of angle;

(b) executing a circular arc interpolation processing on the calculated distance interval for the rotation axis and a moving command value for the linear axis, which is represented by a unit of length, so as to calculate a first distribution amount for the rotation axis and a second distribution amount for the linear axis, respectively;

(c) converting the first distribution amount into a third distribution amount which is represented by a unit of angle; and

(d) controlling the linear and rotation axes of the machine tool in accordance with the second and third distribution amounts, respectively.

4,878,172

FOUR-AXIS LATHE NC PROGRAM CREATION METHOD

Teruyuki Matsumura, Tokyo, Japan, assignor to Fanuc Ltd., Minamitsuru, Japan

PCT No. PCT/JP87/00203, § 371 Date Nov. 25, 1987, § 102(e) Date Nov. 25, 1987, PCT Pub. No. WO87/05845, PCT Pub. Date Oct. 8, 1987

PCT Filed Apr. 1, 1987, Ser. No. 131,192

Claims priority, application Japan, Apr. 1, 1986, 61-75301

Int. Cl.[4] B23Q *15/00*

U.S. Cl. 364—191 **6 Claims**

1. A numerical control program creation method for a four-axis lathe, having first and second tool rests, comprising the steps of:

(a) displaying conversational frames corresponding to a plurality of input steps on a display unit;

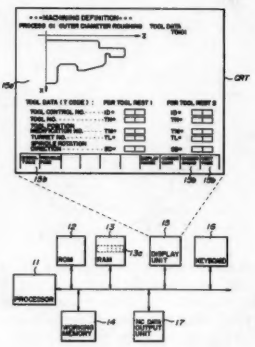
(b) inputting data in the conversational frames, for specifying a finished profile, machining processes and tools used;

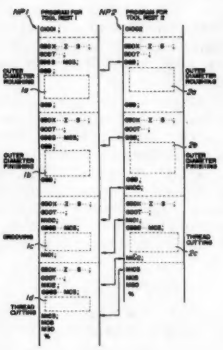
(c) creating first and second numerical control programs for controlling the first and second tool rests of the four-axis lathe, using the data input in step (b);

(d) previously inputting and storing in memory a name of a balance cutting machining process;

(e) checking whether the machining process to be balanced cut has been inputted in step (b);

(f) displaying a balance cut conversational frame, calling for tool data for both the first and second tool rests when the name of the machining process to be balance cut is input; and





(g) inserting an execution control instruction in front of numerical control data created in step (c) for the balance cutting machining process, the execution control instruction controlling movement of one of the tool rests in symmetrical fachion in synchronism with the other of the tool rests.

4,878,173

CONTROLLER BURST MULTIPLEXOR CHANNEL INTERFACE

Kenneth S. Goekjian, Candia, N.H., assignor to Data General Corporation, Westboro, Mass.

Filed May 16, 1988, Ser. No. 194,685

Int. Cl.[4] G06F *3/00*

U.S. Cl. 364—200 **1 Claim**

1. A data processing system comprising:

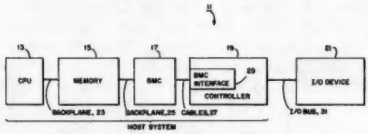
a. a central processor unit,

b. a memory connected to said central processor unit,

c. a burst multiplexor channel connected to said memory,

d. a controller, and

e. an interface for connecting said controller to said burst multiplexor channel, said interface including two sections,



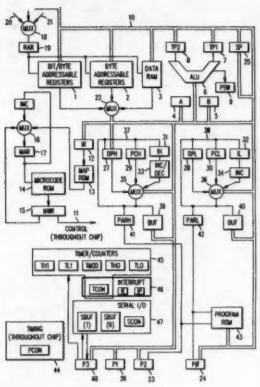
one section handling the transfer of data and the other handling the transfer of command and status information.

4,878,174

FLEXIBLE ASIC MICROCOMPUTER PERMITTING THE MODULE MODIFICATION OF DEDICATED FUNCTIONS AND MACROINSTRUCTIONS

Daniel Watkins, Saratoga; Jimmy Wong, Cupertino, and Pavlina Ennghillis, Palo Alto, all of Calif., assignors to LSI Logic Corporation, Milpitas, Calif.

Filed Nov. 3, 1987, Ser. No. 116,411
Int. Cl.[4] G06F *9/22, 13/00*
U.S. Cl. 364—200 **8 Claims**



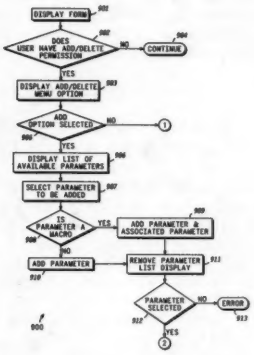
1. A digital computer on a single substrate comprising:
a bidirectional data bus;
memory for the storage of data or code, said memory comprising:
one or more registers used for the temporary storage of data during the operation of said digital computer;
means for addressing said memory, said addressing means comprising:
means for including the addresses of external device registers, not located on said substrate, within the same address space used for said memory, said means permitting the same degree of direct manipulation of said external registers as is permitted registers located on said substrate; and
a central processing unit which interprets and executes macroinstructions, and which performs arithmetic and logical operations, said central processing unit coupled to said data bus, to said memory and to said addressing means, said central processing unit comprising:
a microengine for controlling the operation of said computer, said microengine comprising:
macroinstruction memory for storing one or more of the macroinstructions to be executed by said computer;
microcode memory, said microcode memory comprising one or more microinstructions, each of said microinstructions comprising one or more control signals to control the execution of said macroinstructions;
means for receiving each of said macroinstructions and mapping said macroinstructions into a sequence of microinstructions, said means causing the first microinstruction of said sequence of microinstructions to be executed; and
means for sequencing the execution of said microinstructions; and
means for generating, independently of the operation of said data bus, the address of memory external to said substrate, and the address of the next of said macroinstructions to be executed by said microengine.

4,878,175

METHOD FOR GENERATING PATIENT-SPECIFIC FLOWSHEETS BY ADDING/DELETING PARAMETERS

Ronald E. Norden-Paul, Peoria; Murray A. Fein, Phoenix, and Sandra L. Stewart, Phoenix, all of Ariz., assignors to Emtek Health Care Systems, Tempe, Ariz.

Filed Nov. 3, 1987, Ser. No. 116,611
Int. Cl.[4] G06F *15/42*
U.S. Cl. 364—413.01 **21 Claims**



1. In a medical information system comprising a processing unit, a memory unit, and a terminal unit wherein said terminal unit comprises display means for displaying a patient medical information form to a terminal user and input means for said terminal user to enter patient information into said system and to provide commands to said system, a method of customizing said patient medical information form comprising:
(a) providing to said system an indication of a patient identity using said input means;
(b) providing to said terminal user, via said display means, said patient medical information form relating to said patient identity;
(c) selecting a parameter operation, said parameter operation including adding a new parameter to said patient medical information form or deleting a selected parameter from said patient medical information form;
(d) performing said parameter operation by deleting said selected parameter if said deleting parameter operation was selected in step (c); and
(e) performing said parameter operation by adding said new parameter if said adding parameter operation was selected in step (c).

11. In a medical information system comprising a processing unit, a memory unit, and a terminal unit wherein said terminal unit comprises display means for displaying a patient medical

information form to a terminal user and input means for said terminal user to enter patient information into said system and to provide commands to said system, a method of selectively granting access to said terminal user to customize said patient medical information form, said method comprising:

(a) providing an indication of said user's identity using said input means;

(b) providing an indication of a patient identity using said input means;

(c) providing to said terminal user, via said display means, said patient medical information form;

(d) providing to said terminal user the option of performing a parameter opertion, including adding a new parameter to said patient medical information form or deleting a selected parameter from said patient medical information form;

(e) selecting said parameter operation;

(f) utilizing said terminal user's identity to determine whether said terminal user has permission to perform said selected parameter operation; and

(g) performing said parameter operation if said terminal user has permission, otherwise denying said terminal user the right to perform said selected parameter operation.

21. In a medical information system comprising a processing unit, a memory unit, a terminal unit wherein said terminal unit comprises display means for displaying a patient medical information form to a terminal user and input means for said terminal user to enter patient information into said system and to provide commands to said system, and a parameter set including a macro parameter and an associated parameter, a method of customizing said patient medical information form comprising:

(a) providing to said system an indication of a patient identity using said input means;

(b) providing to said terminal user, via said display means, said patient medical information form relating to said patient identity;

(c) selecting a parameter operation, said parameter operation including adding a new parameter to said patient medical information form or deleting a selected parameter from said patient medical information form;

(d) performing said parameter operation by deleting said selected parameter if said deleting parameter operation was selected in step (c);

(e) deleting said associated parameter if said selected parameter in step (d) is said macro parameter;

(f) performing said parameter operation by adding said new parameter if said adding parameter operation was selected in step (c); and

(g) adding said associated parameter if said new parameter in step (f) is said macro parameter.

4,878,176

PRODUCTION PROCESS CONTROL SYSTEM

Mitsuji Teranishi; Yasuo Watanabe, and Akira Takeuchi, all of Osaka, Japan, assignors to ASICS Corporation, Kobe, Japan

Continuation of Ser. No. 730,185, May 3, 1985, abandoned. This application Mar. 22, 1988, Ser. No. 171,226

Claims priority, application Japan, May 4, 1984, 59-89831; May 4, 1984, 59-89832; May 4, 1984, 59-89833; May 4, 1984, 59-65805[U]; May 4, 1984, 59-89835; May 4, 1984, 59-89836; May 4, 1984, 59-89837; May 4, 1984, 59-65803; May 4, 1984, 59-65804[U]; May 4, 1986, 59-89834

Int. Cl.[4] G06F *1/00*

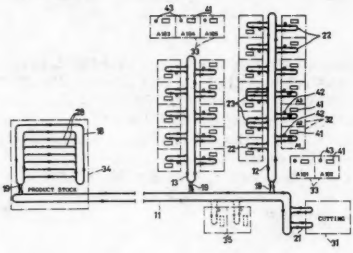
U.S. Cl. 364—468 34 Claims

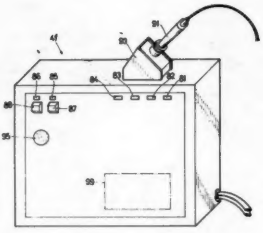
1. A production process control system, to control work being performed by a plurality of workers on a succession of articles moved by carriers of a conveyor line to work machines located in a plurality of work areas, comprising:

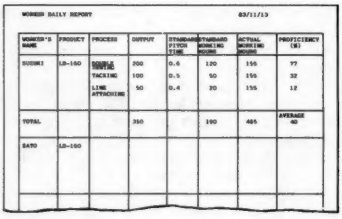
a plurality of sensors, with one of said sensors being located at each of said work areas, said sensors being operable for detecting articles that have been worked on at the corresponding work areas, as said articles are transported to the next successive work areas, and for generating corresponding detection signals;

a plurality of terminal devices with a terminal device located at each of said work areas, each of the terminal devices comprising means for determining a work output at a work area based on a detection signal sent from a corresponding sensor located thereat, means for entering a worker identifying code by the worker producing said work output, and means for transmitting data related to said work output and the corresponding worker identifying code; and

a central device comprising means for performing communications with each of said terminal devices, said central device also comprising means for storing at least said data related to said work output and the worker identifying code transmitted from the terminal devices.



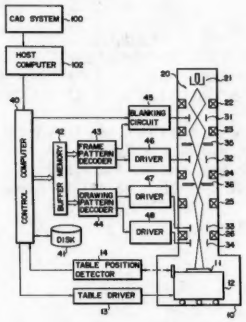




4,878,177
METHOD FOR DRAWING A DESIRED CIRCUIT PATTERN USING CHARGED PARTICLE BEAM

Osamu Ikenaga, and Susumu Watanabe, both of Kawasaki, Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Feb. 11, 1988, Ser. No. 155,027
Claims priority, application Japan, Feb. 16, 1987, 62-32718
Int. Cl.[4] H01J *37/302*
U.S. Cl. 364—489 **7 Claims**



1. A method for determining unit figures in a circuit pattern to be exposed using a charged particle beam, said circuit pattern having a figure of a polygonal planar shape and vertexes, said method comprising the steps of:

dividing said figure of said circuit pattern into first unit figures by parallel line segments extending from said vertexes thereof in a first reference direction, each of said first unit figures corresponding to one of reference figures including a rectangle, a trapezoid, and a parallelogram;

detecting a first too-small figure having at least one side shorter than a minimum allowable side length;

merging new said first too-small figure with a certain unit figure adjacent thereto, thus defining a first expanded figure, the remaining unit figure or figures of said first unit figures being kept unchanged during this process; and

dividing said expanded figure into second unit figures by parallel line segments extending from vertexes thereof in a second reference direction substantially perpendicular to the first reference direction, said second unit figures corresponding to said reference figures.

4,878,178
IMAGE PROCESSING DEVICE

Masaki Takakura, Higashiosaka; Hideto Hayasaki, Nara; Hideo Takemura, Gose; Masao Izumi, Tenri; Keisuke Iwasaki, Tenri; Yoji Noguchi, Ikoma; Yasukuni Yamane, Shiki, and Noritoshi Kako, Nara, all of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

Filed Dec. 24, 1986, Ser. No. 946,482
Claims priority, application Japan, Dec. 25, 1985, 60-294490; Jan. 27, 1986, 61-16386; Jan. 31, 1986, 61-20692; Mar. 24, 1986, 61-66819; Mar. 24, 1986, 61-66820; Mar. 24, 1986, 61-66821; Mar. 24, 1986, 61-66822; Apr. 9, 1986, 61-83065; Apr. 11, 1986, 61-84464
Int. Cl.[4] G06F *15/40*
U.S. Cl. 364—521 **21 Claims**

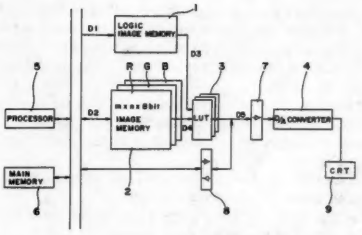
1. An image processing device comprising: generating means for generating a first plurality of pixels and a second plurality of pixel;

an image memory for storing intensity information corresponding to said first plurality of pixels which compose an original image;

a logic image memory for storing label information of said second plurality of pixels corresponding to an area of said original image in said first plurality of pixels whose intensity information is to be changed;

a look-up table memory, to which output information from said image memory and said logic image memory is inputted, for resetting the intensity information for said area of said original image corresponding to said label information and developing a changed image in response; and

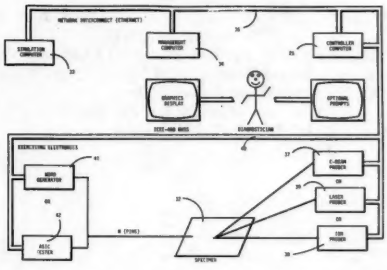
display means for displaying said changed image.



4,878,179
INTERACTIVE DIAGNOSTIC METHODOLOGY AND APPARATUS FOR MICROELECTRONIC DEVICES

Robert P. Larsen, Fullerton; Steven T. Hoelke, Claremont, and James A. Luisi, Anaheim, all of Calif., assignors to Rockwell International Corporation, El Segundo, Calif.

Filed Nov. 12, 1987, Ser. No. 119,741
Int. Cl.[4] G01R *31/28*; G06F *11/00*
U.S. Cl. 364—490 **10 Claims**
MICROFICHE APPENDIX INCLUDED
(3 Microfiche, 274 Pages)



1. Apparatus for diagnosing abnormal behavior in a malfunctioning integrated circuit specimen comprising in combination:

noncontact probe means for acquiring voltage waveforms to be measured at selectible circuit nodes within the specimen;

stimulator means;

simulator means

computer means including display means for composing, modifying and displaying input stimuli patterns for application to the stimulator means the simulator means;

said stimulator means utilizing said input stimuli patterns from the computer means for dynamically exercising the specimen to output voltage waveforms to be measured;

said simulator means storing a mathematical model of the integrated circuit specimen, as designed, in the form of object clustering data structure enabling concurrent production of corresponding predicted waveforms and waveforms to be measured due to simultaneous stimulation of the specimen and the simulator means;

said display means further exhibiting pictorial representation of the specimen layout, as described in the mathematical model, to allow an operator select a node on the layout where comparison of measured and simulated waveforms from the mathematical node and corresponding specimen node are to be made;

said simulator means outputting predicted behavioral characteristics of the circuit specimen as predicted waveforms applied to the display means along with any output waveform of the noncontact probe means acquired during said exercising; and

said display means also enabling pictorial comparison of said predicted and measured waveforms to permit identification of circuit errors causing abnormal behavior in the specimen.

10. A method for determining the cause of mal-function in an integrated circuit, comprising the steps of:

noncontact probing for detecting the magnitude of an analog waveform at a selected node site on the circuit;

storing a mathematical model of the integrated circuit based on an object clustering data structure for predicting analog and digital waveform;

storing analog measured and predicted waveforms;

storing digital stimuli waveforms;

simultaneously applying selected stimuli to the circuit observed by the noncontact probing and to the stored mathematical model underlying the simulation;

displaying a response to the stored output of the noncontact probing and to the stored simulated output of the mathematical model to portray separate waveforms for each to permit determination of whether or not the waveforms agree or disagree; and

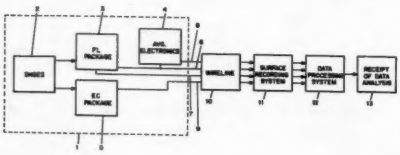
steering the noncontact probing to additional node sites for exploring circuit behavior, incrementally until the node site indicating a mal-function by waveform disagreement is identified.

4,878,180

METHOD OF EVALUATING THE CONDITION OF TUBULAR GOODS

Vernie C. McWhirter, Pearland; James E. Pickett, and Norman R. Carlson, both of Houston, all of Tex., assignors to Western Atlas International, Inc., Houston, Tex.

Filed Nov. 18, 1985, Ser. No. 799,226
Int. Cl.[4] G01N *29/04;* G06F *15/20*
U.S. Cl. 364—507 **8 Claims**



1. A method of evaluating state of deterioration due to corrosion of a string of subsurface well casing having a plurality of tubular casing lengths by passing an inspection instrument through the inside of a casing length under inspection and submitting signal outputs of said inspection instrument to a process of analysis to exclude effects of structural configuration about said casing comprising the steps of:

deriving first and second measurements from said inspection instrument;

combining said first and second measurements;

analyzing said combined measurement and excluding responses caused by said structural configuration about said casing therefrom wherein the step of analyzing said combined measurement and excluding responses caused by said structural configuration about said casing therefrom further comprises the steps of:

locating collars along said casing length under inspection; and

excluding from analysis for evaluating said state of deterioration responses caused by said collars; and

analyzing remaining response for evaluating said state of deterioration of said casing;

deriving a third measurement from said inspection instruments; and

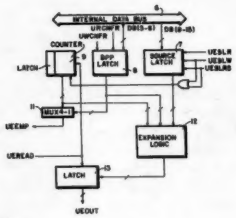
comparing said third measurement to said combined measurement to determine whether casing defects are located inside or outside of the said casing.

4,878,181

VIDEO DISPLAY CONTROLLER FOR EXPANDING MONOCHROME DATA TO PROGRAMMABLE FOREGROUND AND BACKGROUND COLOR IMAGE DATA

Craig A. MacKenna, Los Gatos, and Jan-Kwei J. Li, San Jose, both of Calif., assignors to Signetics Corporation, Calif.

Continuation-in-part of Ser. No. 931,760, Nov. 17, 1986, abandoned. This application Nov. 13, 1987, Ser. No. 121,504
Int. Cl.[4] G06F *3/153*
U.S. Cl. 364—518 **10 Claims**



1. A video display controller for use in a color image display system for expanding a monochrome image pattern stored in a display memory in the form of one bit per image pixel to a color image pattern having multiple bits signifying foreground and background color of each pixel, and integrating such multiple bits with the stored bit pattern to derive a corresponding color image; such video controller comprising:

a bit expander circuit including

a source latch for storing the pixel bits of a part of said monochrome image;

bits per pixel means for setting the number of bits per pixel in the expanded color image of said part of said monochrome image, to thereby define the extent of the multiple bit expansion to be performed;

source tracking means which monitor the contents of said source latch and signal when to reload said source latch from said display memory; and

expansion logic circuit means having inputs connected to outputs of said source latch, said bits per pixel means, and said source tracking means; said expansion logic circuit means having outputs at which it produces signals respectively representing the contents of said source latch and a number of consecutive bits corresponding to an expansion of the contents of said source latch, the number of consecutive bits in such expansion which correspond to each bit in the source latch being as defined by said bits per pixel means;

pattern alignment means for shifting the signals at the outputs of said expansion logic circuit means so as to correspond to the positioning of destination words stored in said display memory;

pattern generating circuit means including

a foreground color register programmable with pixel values to be substituted for "1" pixel bits of said monochrome image;

a background color register programmable with pixel values which are to be substituted for "0" pixel bits of said monochrome image;

a single-bit register programmable to control whether "0" pixel bits in said monochrome image pattern are to remain unchanged or are to be replaced by pixel values stored in said background color register;

a destination latch for temporarily storing destination words stored in said display memory; and

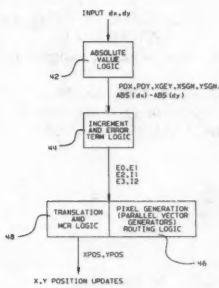
multiplexing means which selects among the contents of said foreground color register, said background color register and said destination latch under control of said single-bit register and said pattern alignment means; said multiplexing means having an output at which it produces new destination words for replacing destination words currently stored in said display memory; and

control means which sequence the reading of said display memory and storage of data therefrom in said source latch and in said destination latch, and the writing of said new destination words provided by said multiplexing means into said display memory.

4,878,182
MULTIPLE PIXEL GENERATOR

Michael A. Aranda, Saugerties; Timothy J. Ebbers, Shokan; Yoshio Iida, Lake Katrine; Terence W. Lindgren, Rosendale, and Taggart H. Robertson, Earlton, all of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Oct. 30, 1987, Ser. No. 115,451
Int. Cl.[4] G06F *15/40*
U.S. Cl. 364—518 33 Claims



1. A method for generating positioning values for a plurality of line points or pixels in a single machine cycle of a line generating system, wherein said positioning values represent the integer change in position relative to a previous pixel position necessary to represent an approximation of a linear function of at least one of the coordinates of said pixels, said method comprising:

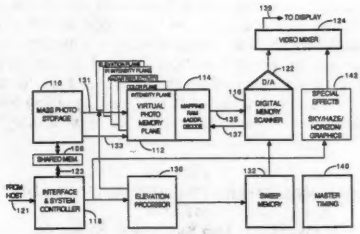
generating error terms according to Bresenham's algorithm for each of a plurality of contiguous pixels, with the number of said contiguous pixels being equal to the number of pixels which are to be generated during said single machine cycle; and

generating, during said machine cycle, the positioning values for said plurality of pixels in a plurality of vector generators which are connected in parallel with one another and which are arranged so that each of said vector generators provides the positioning value for an associated one of said plurality of pixels, with the positioning value for each said pixel being determined, at least on part, as a function of the number of pixels being generated in one cycle and as a function of said error terms generated according to Bresenham's algorithm.

4,878,183
PHOTOGRAPHIC IMAGE DATA MANAGEMENT SYSTEM FOR A VISUAL SYSTEM

Ron B. Ewart, 5451 Hunter Rd., Enon, Ohio 45323

Filed Jul. 15, 1987, Ser. No. 73,789
Int. Cl.[4] G11C *8/00*
U.S. Cl. 364—521 4 Claims



1. An image data management system for generating image data for a visual system in successive frames at a given frame rate for display on a display device in accordance with viewing data from a host central processing unit, said system comprising:

a first memory for mass storage, a second memory used as a virtual image memory, a digital memory scanner, a controller coupled to the first and second memories and to the digital memory scanner for control thereof, first address bus means and first data bus means coupled from the first memory to the second memory, second address bus means coupled from the memory scanner to the second memory, second data bus means coupled from the second memory to the digital memory scanner for transferring video data, an image display bus coupled from the digital memory scanner to the display device, and a CPU bus coupled from the host central processing unit to said controller and also to the digital memory scanner;

means for organizing the first memory in files of photo-based digitized images in an interlaced data format on a non-compressed pixel-by-pixel basis using cells at N different levels, from level 1 having least detail to level N having the highest detail, with each file comprising a given number of digital data elements at only one of said levels for one cell, and each data element having a predetermined number of bits;

means for organizing the second memory as a plurality of cells, with each cell comprising a data storage area of a size for storing one of said files in the same interlaced data format as in the first memory, and a mapping unit having mapping random access memory and address decoding logic, the mapping unit being coupled to said controller via a mapping and control signal bus for receiving decoding and control data;

wherein the CPU bus is used as means for providing said viewing data from the host central processing unit to the controller, with the viewing data including information relating to position and look angle, wherein said controller includes means for controlling the first address bus means and the first data bus means to direct transfers of the files of data from the first memory into the second memory, with only one cell of the first memory being accessed at any one time, and an entire file of data being stored in one cell of the second memory, the files stored into the second memory being determined by said viewing data, the files of data being placed into cells of the second memory which are unused or no-longer-needed cells, and wherein the controller simultaneously loads the mapping unit with appropriate decoding and control data via the mapping

and control signal bus for use by the digital memory scanner to find the interlaced data;

wherein said digital memory scanner includes means for taking viewing data from the controller, using the viewing data to select a level of detail for each area of a display and to generate addresses of data required to create a display, accessing the cells of the second memory via the second address bus means, and via the mapping unit of each cell to cause video data to be transferred from the data storage areas of selected cells via the second data bus means, formatting the data for each area of a display in accordance with the level of detail selected, by interlacing the data for a number of levels from level 1 to the level of detail selected for each said area, and supplying frames of video data via the image display bus to the display means.

4,878,184

ELECTRONIC THERMOMETER WITH PREDICTING MEANS

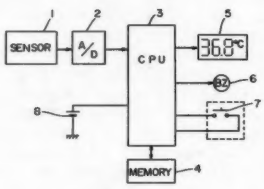
Masamichi Okada, and Isao Kai, both of Kyoto, Japan, assignors to Omron Tateisi Electronics Co., Kyoto, Japan

Filed Feb. 10, 1987, Ser. No. 13,295

Claims priority, application Japan, Feb. 10, 1986, 61-27318; Feb. 14, 1986, 61-31496; Feb. 21, 1986, 61-38038

Int. Cl.[4] G06F *15/42;* G01K *3/00*

U.S. Cl. 364—557 **5 Claims**



1. An electronic thermometer comprising

sensing means for sensing a temperature to be taken thereby,

storage means for storing therein a measured temperature value representing the temperature sensed by said sensing means,

prediction means for computing a predicted temperature value based on said measured value stored in said storage means,

display means for displaying, selectively, said measured temperature value and said predicted temperature value,

judging means for determining whether or not a response value, of a response curve based on data of said measured temperature value, has attained a predetermined value at which to initiate an operation for changing a state of said display means;

means for comparing said measured and predicted temperature values and producing a difference value; and

means for switching the displaying of said display means according to said difference value reaching a threshold.

4,878,185

DIGITAL MEASURING INSTRUMENT

Klaus-Peter Brand, Wettingen; Jürgen Kopainsky, Brugg, and Fritz Wittwer, Turgi, all of Switzerland, assignors to BBC Brown Boveri AG, Baden, Switzerland

Filed Oct. 27, 1987, Ser. No. 113,119

Claims priority, application Switzerland, Nov. 4, 1986, 4361/86

Int. Cl.[4] G06F *15/20*

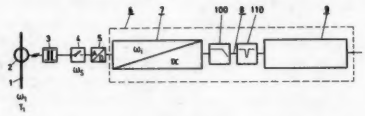
U.S. Cl. 364—572 **15 Claims**

1. A digital measuring instrument for processing analog output signals emitted by at least one sensor of an electrical supply system containing harmonics, said digital measuring instrument comprising:

a sample and hold circuit for sampling the analog output signals at a predetermined sampling rate and temporarily storing the sampled values,

an analog/digital converter which follows the sample and hold circuit, for digitizing the sampled and temporarily stored values of the output signals, and

a digital processing unit, which is connected to the output of the analog/digital converter, for determining at least one



system-specific quantity from the digitized values of the output signals supplied,

wherein the digital processing unit includes at least one block for shifting frequencies (ω_1, ω_l) of a fundamental wave and harmonics of the supply system to a direct-current signal which is proportional to at least one system-specific quantity, and at least one filter arrangement, which follows the at least one frequency shifting block, with a least one digital low-pass filter for suppressing the harmonic frequencies deviating from said direct current signal and with at least one digital band stop filter for suppressing aliasing frequencies.

4,878,186

METHOD AND CIRCUIT FOR PROCESSING NARROW BAND SIGNALS LOCATED IN A WIDE BAND HAVING DISTURBANCE

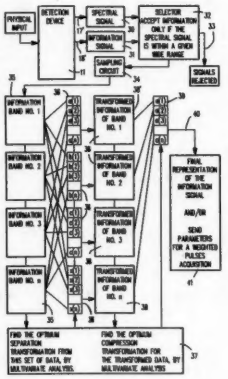
Daniel Gagnon, Montreal, Canada, assignor to Ultimage Inc., Quebec, Canada

Filed Sep. 4, 1987, Ser. No. 93,997

Claims priority, application Canada, Aug. 27, 1987, 545529

Int. Cl.[4] G06F *15/42, 15/62*

U.S. Cl. 364—574 **20 Claims**



1. A method of processing information signals contained in a plurality of contiguous energy bands of a wide band signal generated by photon emission and containing desired information signals and undesired noise signals and wherein a radiation detector produces position signals and energy signals representative of said photon emission, said method comprising the steps of:

(i) directing said position signals in predetermined ones of a first plurality of storage banks corresponding to said con-

tiguous energy bands, said position signals being directed and cumulated into specific ones of said banks as determined by the level of its corresponding energy signal,

(ii) evaluating the relation between the cumulative position signals in said storage banks by comparing the signals in each bank with every other one of said banks and rating the similarity of signals between said banks,

(iii) selecting information from said cumulative position signals in each banks in accordance with said rating to minimize similarities between said cumulative position signals,

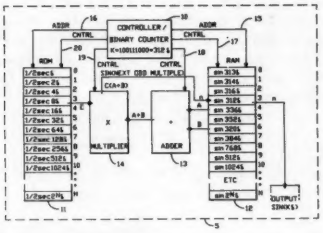
(iv) transferring in a second plurality of storage banks, classified in accordance with the nature of said rated information from said first storage banks whereby to isolate desired signals from undesired noise signals known to be different in nature, and

(v) weighting said signal information in said second banks to produce an interpretable signal representative of said desired information signal contained in said photon emission.

4,878,187
APPARATUS AND METHOD FOR GENERATING A SEQUENCE OF SINES OR COSINES

Oscar Buneman, Los Altos Hills, Calif., assignor to The Board of Trustees of the Leland Stanford Junior University, Palo Alto, Calif.

Filed Jun. 22, 1988, Ser. No. 209,947
Int. Cl.[4] G06F *1/02*
U.S. Cl. 364—721 **20 Claims**



1. An apparatus for generating a sequence of trigonometric functions for successive angles $K\delta$, for K equal to 1 through up to 2^N and δ equal to a constant, comprising:

a first storage array including N+1 storage locations addressed by addresses C, for C equal to 0 through N, the storage location addressed by C storing a value proportional to secant($2^C\delta$);

a second storage array including N+1 storage locations addressed by addresses n, A, and B, for n equal to 0 through N, where A and B are addresses in the range on 0 to N, the storage location addressed by n storing the trigonometric function for angle $S_n\delta$, where S_n equals an odd multiple of 2^n, the odd multiple being a lowest next odd multiple in the successive angles;

a counter generating K;

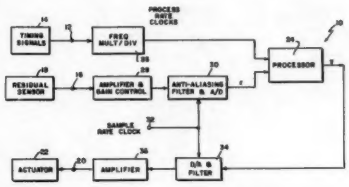
means, coupled to the first storage array and to the second storage array, for generating the trigonometric function of the lowest next odd multiple S_n for storage in the location addressed by n, in response to data in the locations addressed by A, B and C; and

a controller, coupled to the first storage array, the second storage array, the counter, and the means for generating, for calculating the addresses n, A, B, and C in response to K, and for controlling operation of the apparatus so that for each successive angle $K\delta$, the trigonometric function stored in the location addressed by n is supplied as output in the sequence, and is replaced by the trigonometric function of the lowest next odd multiple of S_n in the successive angles.

4,878,188
SELECTIVE ACTIVE CANCELLATION SYSTEM FOR REPETITIVE PHENOMENA

Eldon Ziegler, Jr., Columbia, Md., assignor to Noise Cancellation Tech, Columbia, Md.

Filed Aug. 30, 1988, Ser. No. 238,188
Int. Cl.[4] G06F *15/31*
U.S. Cl. 364—724.01 **9 Claims**



1. Repetitive phenomena cancellation controller comprising:

phenomena input means for providing a phenomena signal representing a Phenomena to be cancelled;

timing input means for providing a timing signal representative of a repetition rate of said phenomena;

processor means, having inputs for said phenomena signal and said timing signal, for generating a cancellation signal to substantially eliminate said phenomena;

output means connected to said processor means for providing a cancellation phenomena as a function of said cancellation signal;

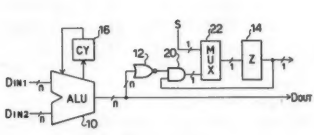
adaptive filter means, in said processor means, for generating said cancellation signal by adapting the filter means filtering characteristics as a function of said phenomena signal and timing signal; and

phase means, in said processor means, for maintaining said adapting of said filtering characteristic within a 90° phase of said phenomena signal.

4,878,189
MICROCOMPUTER HAVING Z-FLAG CAPABLE OF DETECTING COINCIDENCE AT HIGH SPEED

Kazuhide Kawada, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan

Filed Oct. 1, 1987, Ser. No. 103,320
Claims priority, application Japan, Oct. 1, 1986, 61-234924
Int. Cl.[4] G06F *7/00*
U.S. Cl. 364—736.5 **7 Claims**



1. A microcomputer comprising:

operation means receiving two input data for executing designated operations in sequence for the two input data,

zero detection means coupled to the operation means for detecting that the result of each of the designated operations is zero,

storing means coupled to the zero detection means for storing the result of zero detection, and

control means coupled to the zero detection means and the storing means for controlling the storing means to indicate

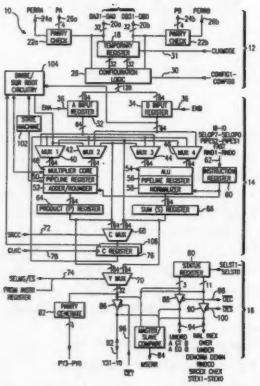
that the result of operation is not zero although the zero is detected by the zero detection means after a non-zero has been detected once by the zero detection means and stored in the storing means in the sequence of the designated operations.

4,878,190

FLOATING POINT/INTEGER PROCESSOR WITH DIVIDE AND SQUARE ROOT FUNCTIONS

Henry M. Darley, Plano; Michael C. Gill; Dale C. Earl, both of Dallas; Dinh T. Ngo, Irving; Paul C. Wang; Maria B. L. Hipona, both of Dallas, all of Tex., and Jim Dodrill, Durham, N.C., assignors to Texas Instruments Incorporated, Dallas, Tex.

Filed Jan. 29, 1988, Ser. No. 150,363
Int. Cl.[4] G06F 7/38
U.S. Cl. 364—752 **14 Claims**



1. Apparatus for calculating a selected value of a quotient or a square root of an operand, comprising:

multiplier circuitry having at least first and second inputs receiving first and second numeric signals respectively, said multiplier circuitry including a first portion for producing a product of the first and second numeric signals representing an approximation of the value and a second portion for producing a conversion of said product into a predetermined numeric representation;

first feedback circuitry transmitting said conversion to the first input of the multiplier circuitry; and

second feedback circuitry transmitting said product to the second input of said multiplier circuitry.

4,878,191

MULTIPLICATION CIRCUIT CAPABLE OF OPERATING AT A HIGH SPEED WITH A SMALL AMOUNT OF HARDWARE

Tetsuji Oguchi, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan

Filed Feb. 16, 1988, Ser. No. 155,771
Claims priority, application Japan, Feb. 13, 1987, 62-31026
Int. Cl.[4] G06F 7/50
U.S. Cl. 364—759 **4 Claims**

1. A multiplication circuit comprising:

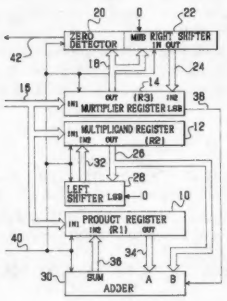
a multiplier register coupled to receive an initial value of a multiplier before start of a multiplication operation;

a zero detector coupled to the multiplier register to generate a signal indicative of completion of the multiplication operation when all of predetermined bits of the multiplier register are zero;

a first shifter coupled to the multiplier register to receive the bits of the multiplier register so as to shift the input data, one bit in a direction from a more significant bit to a less significant bit, and to put "0" at its most significant bit, the first shifter rewriting the multiplier register with the shifted data having the most significant bit of "0";

a multiplicand register coupled to receive an initial value of a multiplicand before start of a multiplication operation;

a second shifter coupled to the multiplicand register to receive the bits of the multiplicand register so as to shift the input data, one bit in a direction from a less significant bit to a more significant bit, and to put "0" at its least significant bit, the second shifter rewriting the multiplicand register with the shifted data having the least significant bit of "0";



a product register coupled to receive an initial value of a product before start of a multiplication operation; and

an adder coupled to receive a content of the product register and a content of the multiplicand register and responding to the least significant bit of the multiplier register so as to execute an addition between the content of the product register and the content of the multiplicand register when the least significant bit of the multiplier register is "1", the adder rewriting the product register with the result of the addition,

whereby the rewritings of the multiplier register, the multiplicand register and the product register are executed in parallel.

4,878,192

ARITHMETIC PROCESSOR AND DIVIDER USING REDUNDANT SIGNED DIGIT ARITHMETIC

Tamotsu Nishiyama, and Shigeo Kuninobu, both of Osaka, Japan, assignors to Matsushita Electric Industrial Co. Ltd., Osaka, Japan

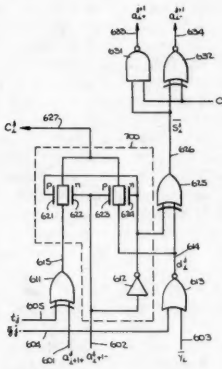
Continuation-in-part of Ser. No. 66,817, Jun. 25, 1987. This application Jul. 7, 1987, Ser. No. 70,565
Claims priority, application Japan, Jul. 11, 1986, 61-164090; Jul. 11, 1986, 61-164091
Int. Cl.[4] G06F 7/49
U.S. Cl. 364—768 **23 Claims**

1. An arithmetic processor which performs carry-propagation-free addition operations utilizing binary signed-digit arithmetic on a binary signed-digit number and a conventional binary number, each having N digits denoted by an order index i which assumes integer values ranging from 1 to N, said arithmetic processor including a plurality of redundant addition cells connected in an array, each of which performs operations on single digits of a particular order i, said redundant addition cells each comprising:

(a) an intermedite carry generating means having as inputs a 1-bit signal A_i representing the sign of the i-th digit of said signed-digit binary number, a one bit signal B_i representing the magnitude of the i-th digit of said signed digit binary number and a 1-bit signal y_i representing the i-th digit of said conventional binary number, said intermedi-

ate carry generating means determining therefrom an intermediate carry bit C_i generated by a signed-digit addition operation, and providing said intermediate carry bit C_i to said redundant addition cell which processes the (i+1)-th digit;

(b) an intermediate sum generating means having as inputs said 1-bit signal B_i and said 1-bit signal y_i, and determining therefrom a 1-bit signal S_i representing the intermediate sum digit for the i-th order; and



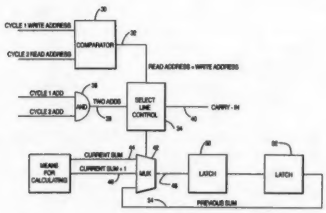
(c) a final sum determining means having as input said 1-bit signal S_i determined by said intermediate sum generating means and a 1-bit signal C_{i-1} corresponding to the intermediate carry digit obtained from a redundant addition cell which processes the (i−1)-th digit, said final sum determining means determining therefrom a 2-bit signal representing the i-th digit of a signed-digit binary number which corresponds to the addition of the i-th order digits of said signed-digit binary number and said conventional binary number.

4,878,193

METHOD AND APPARATUS FOR ACCELERATED ADDITION OF SLICED ADDENDS

Debra Bernstein, Sudbury, and James B. Keller, Arlington, both of Mass., assignors to Digital Equipment Corporation, Maynard, Mass.

Filed Apr. 1, 1988, Ser. No. 176,594
Int. Cl.[4] G06F *7/50*
U.S. Cl. 364—768 **4 Claims**



3. An apparatus for performing an addition operation in a computer on sliced addends in successive microinstructions, the addends having at least a more significant slice and a least significant slice, where a more significant slice in one of the addends in successive microinstructions is a zero, said apparatus comprising:

means for calculating a more significant slice sum, a more significant slice sum+1, and a least significant slice sum of addends of an addition operation in a successive microinstruction;

a multiplexer controlled by control signals on a select line, receiving as inputs from said means for calculating the more significant slice sum and the more significant slice sum+1, and having an output connected to an input of said multiplexer;

a logic gate with an output connected to said select line for outputting a first control signal when:

(i) said least significant slice sum has a carry-out;

(ii) first and second successive microinstructions in successive clock cycles are both add operations; and

(iii) a destination of the first microinstruction is a source for the addition operation of the second microinstruction;

and outputting a second control signal when any of conditions (ii) or (iii) are not met;

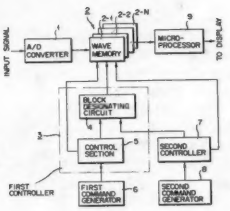
wherein said multiplexer outputs: the more significant slice sum+1 when the first control signal is outputted; and the more significant slice sum when the second control signal is outputted.

4,878,194

DIGITAL SIGNAL PROCESSING APPARATUS

Kenji Nakatsugawa, Aiko; Aiichi Katayama, Isehara, and Hitoshi Sekiya, Atsugi, all of Japan, assignors to Anritsu Corporation, Tokyo, Japan

Continuation of Ser. No. 786,222, Oct. 9, 1985, abandoned. This application Mar. 7, 1988, Ser. No. 168,627
Claims priority, application Japan, Oct. 15, 1984, 59-215862
Int. Cl.[4] G06F *3/14*; H01J *29/70*; G09G *1/00*
U.S. Cl. 364—900 **4 Claims**



1. A digital signal processing apparatus, comprising:

analog-to-digital (A/D) converting means for converting an input analog signal to a corresponding output digital signal;

wave memory means having n memory blocks and coupled to said A/D converting means, for storing the output digital signal in designated ones of said n memory blocks, wherein each block of said n memory blocks stores information corresponding to a waveform of the input analog signal at a give time;

block designating means coupled to said wave memory means for supplying, in a first control mode, an incremented-block-designating signal for accessing each of said n memory blocks in a determined cyclical order, and for supplying, in a second control mode, a randomly selectable, specific-block-designating signal for accessing a selected one of said n memory blocks;

first control means coupled to said wave memory means, and including said block designating means, for outputting a first control signal to said wave memory means for enabling storing and reading operations for each memory block accessed by said block designating means in said first control mode and in response to a block incremental command, wherein the output digital signal of said A/D converting means is stored into, and read out from, each block of said n memory blocks in said determined cyclical

order, each of the n memory blocks being updated after it undergoes a storing operation followed by a read-out operation, and wherein that memory block, in which an oldest output digital signal is stored, is updated to store, and subsequently read out, a newest output digital signal of the A/D converting means by operation of said first control means;

first command generating means coupled to said first control means for generating said block incremental command to access each of said n memory blocks in said cyclical order and to enable storage of the output digital signal from said A/D converting means incrementally in the n memory blocks of said wave memory means, and also to enable incrementally reading out signals stored in the n memory blocks of said wave memory means;

second control means, coupled to said wave memory means and said block designating means, for inhibiting the cyclical storing and reading operations of signals into and from, respectively, said n memory blocks, and for designating a specific block in said second control mode for enabling a reading-out operation from only the specific block so designated in response to a read-out command, said inhibition of the cyclical storing and reading operations, and the read only operation for said specific block in said second control mode, being such that signals ranging from an oldest output digital signal to a newest output digital signal as stored in said n memory blocks can be randomly selected as desired; and

second command generating means coupled to the second control means for generating said read-out command to select said designated memory block and only read out the signal stored in the designated memory block of said n memory blocks.

4,878,195

INSTRUCTION SEQUENCER FOR NETWORK STRUCTURE MICROPROCESSOR

Cristian Bocquet, Aix en Provence, France, assignor to Thomson Semiconducteurs, Paris, France

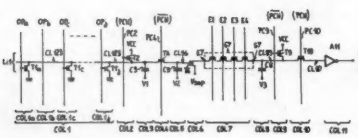
PCT No. PCT/FR86/00302, § 371 Date Apr. 30, 1987, § 102(e) Date Apr. 30, 1987, PCT Pub. No. WO87/01838, PCT Pub. Date Mar. 26, 1987

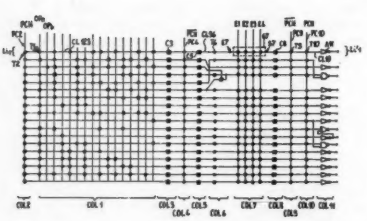
PCT Filed Sep. 10, 1986, Ser. No. 51,144

Claims priority, application France, Sep. 13, 1985, 85 13634

Int. Cl.[4] G06F *9/22*

U.S. Cl. 364—900 **2 Claims**





1. An instruction sequencer for a microprocessor, said sequencer having inputs for receiving binary instruction signals and outputs for supplying control signals for controlling operation of said microprocessor, said sequencer comprising:

(a) sequencer inputs connected to input conductors which are arranged in a group of first parallel columns, each of said inputs corresponding to a respective first column of said group;

(b) wherein each of the first column of said group further comprises a plurality of decoding transistors, said decoding transistors of the group of the first parallel columns being furthermore aligned along rows perpendicular to the column direction with, each of the decoding transistor at the intersection of a given row and a given column having its gate connected to an input conductor corresponding to said column and having its drain connected to one row conductor of a first group of row conductors, each of which corresponds to a respective row of decoding transistors;

(c) wherein each of the row conductors of said first group of row conductors is connected to a respective first precharged transistors, with each of said precharged transistors having its gate controlled by a first clock signal, and further wherein each of said precharged transistors is placed along the length of a second column which is parallel to the first group of columns; and

(d) further wherein each row conductor is connected to a respective first capacitor, the first capacitors being placed along a third column which is parallel to said first and second columns;

(e) further wherein each row conductor is connected to the source of respective first sampling transistors, with each of said sampling transistors having its gate controlled by a second clock signal and having its drain connected to a row conductor of a second group of row conductors perpendicular to said columns, the first sampling transistors being furthermore placed along a fourth column which is parallel to said first, second and third columns;

(f) wherein each of first sampling transistor's drain is further connected to a second respective capacitor, wherein said second capacitors being placed along a fifth column which is parallel to the first, second and third columns;

(g) wherein each row conductor of the second group of row conductors is connected to the gate of a respective transistor taken among transistors of a sixth column parallel to said first, second, and third columns, the drain of said respective transistor being connected to an input of a respective logical controlled gate, and all the sources of said transistors of said sixth column being connected to a common point;

(h) logical controlled gates arranged along a seventh column parallel to said first and second columns, and having an output connected first to third respective capacitors, second to a second precharged transistor, and third to a second sampling transistor, said third capacitors being placed along an eighth column, the second precharged transistors being placed along a ninth column and being controlled by a third clock signal, said second sampling transistors being placed along a tenth column and being controlled by a fourth clock signal.

4,878,196

COMMUNICATIONS MANAGEMENT SYSTEM

Frederick A. Rose, Rte. 3, Box 529, Fort Atkinson, Wis. 53538

Filed Dec. 18, 1986, Ser. No. 943,565

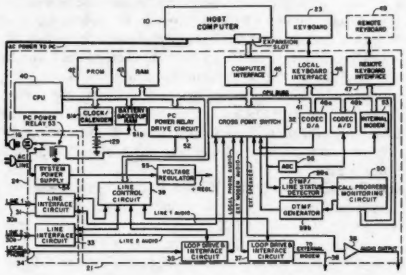
Int. Cl.[4] G06F *1/00*

U.S. Cl. 364—900 **7 Claims**

1. A communications management system for use in conjunction with an externally-powered host computer for responding to communications signals on a telephone line, comprising:

a power control means in the form of a relay, said relay being electrically connected to a power source and responsive to an applied control signal for supplying operating power from said power source to the host computer;

a printed circuit board connected to said host computer, said printed circuit board including control circuit means electrically connected to said power control means for supplying said control signal to said relay to power up said host computer, said control circuit means supplying said control signal in response to receiving the communications signals on the telephone line; and



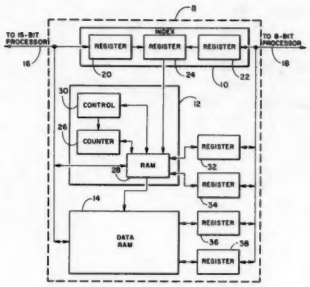
means for processing information received over said telephone line following said power up of said host computer, said means for processing including an analog-to-digital converter operatively associated with said control circuit means and storage means for retrievably storing said information within either said management system or within said host computer, said storage means being electrically connected to said analog-to-digital converter.

4,878,197

DATA COMMUNICATION APPARATUS

Daniel L. Nay, Rancho Palos Verdes; Darryl K. Korn, Laguna Beach, and John T. Ralph, Mission Viejo, all of Calif., assignors to Control Data Corporation, Minneapolis, Minn.

Filed Aug. 17, 1987, Ser. No. 85,812
Int. Cl.[4] G06F *15/16*; H04J *3/00*
U.S. Cl. 364—900 **18 Claims**



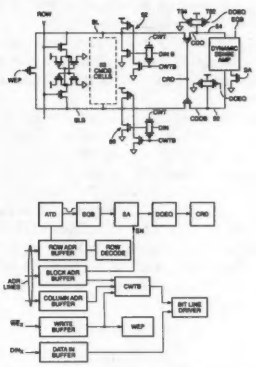
1. Data communication apparatus for transferring data between first and second channels wherein the data format on the first channel is incompatible with the data format on the second channel, said apparatus comprising: index means connected to said first and second channels for receiving and processing index addresses from each of said first and second channels; first memory means having a plurality of first memory locations each containing a memory address, said first memory means being connected to said index means and being responsive to an index address to retrieve a memory address from a first memory location identified by said index address, said first memory means being connected to said first and second channels to receive memory addresses from said first and second channels, said first memory means further including first memory register means connected to said second channel for formatting memory addressing between the address formats of said first and second channels; and second memory means having a plurality of second memory locations, said second memory means being connected to said first and second channels and to said first memory means for storing data from a selected first or second channel at a second memory location selected by the retrieved memory address and for reading data onto a selected first or second channel from a second memory location selected by the retrieved memory address.

4,878,198

STATIC RAM WITH COMMON DATA LINE EQUALIZATION

Richard S. Roy, Pleasanton, Calif., assignor to Visic, Incorporated, San Jose, Calif.

Filed Jan. 25, 1988, Ser. No. 148,279
Int. Cl.[4] G11C *7/00, 29/00*
U.S. Cl. 365—222 **7 Claims**



1. A static random access memory, comprising:

an array of memory cells arranged in rows and columns, with the memory cells in each column coupled to a pair of differential bit lines;

a multiplicity of sense amplifiers, and a pair of differential common data out lines coupled to each sense amplifier;

multiplexer means for selectively coupling each said common data out line to a selected one of a predefined set of bit line pairs;

equalization means coupled to each said pair of common data out lines for equalizing the voltage differential in each said pair of common data out lines;

a multiplicity of address lines, and address transition detection means for generating an ATD signal when a transition occurs on any of said address lines;

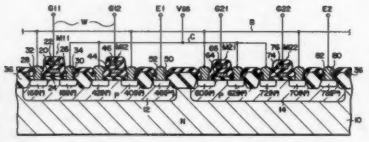
read access control means coupled to said equalization means and multiplexer means, for responding to said ATD signal by disabling said equalization means, enabling said multiplexer means and activating said sense amplifiers, and then disabling said multiplexer means and re-enabling said equalization means;

whereby said read access control means causes said equalization means to begin equalizing each said pair of common data out lines before the end of each memory read cycle.

4,878,199
SEMICONDUCTOR MEMORY DEVICE

Yoshihisa Mizutani, Tokyo, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Jan. 29, 1988, Ser. No. 150,052
Claims priority, application Japan, Feb. 27, 1987, 62-44509
Int. Cl.[4] G11C *11/34*; H01L *29/78*
U.S. Cl. 365—185 **16 Claims**



1. A non-volatile semiconductor memory device comprising:

(a) a semiconductor substrate of a first conductivity type having a surface portion;

(b) memory cells formed in the surface portion of said substrate, said memory cells being divided into a certain number of cell groups, each of said memory cells comprising,

first and second semiconductor layers having the first conductivity type serving as a source and a drain of said memory cell, respectively, and

first and second conductive layers insulatively provided above said substrate and serving as a floating gate electrode and a control gate electrode of said memory cell, respectively;

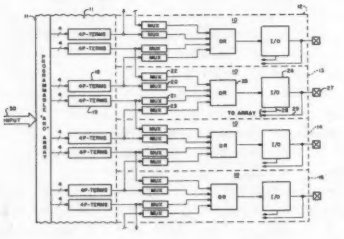
(c) semiconductors well regions of a second conductivity type formed in the surface portion of said substrate to surround said cell groups respectively;

(d) well-potential controller means for applying, when a specific cell group is selected from among said memory cell groups, to said well regions of the remaining cell groups a bias voltage which changes a threshold level of said memory cell to prevent a flow of an ON current between said source and said drain, thereby inhibiting reading and writing of information in the memory cells of said remaining cell groups.

4,878,200
PRODUCT TERM SHARING/ALLOCATION IN AN EPROM ARRAY

Abid Asghar, Fair Oaks, and James R. Donnell, Shingle Springs, both of Calif., assignors to Intel Corporation, Santa Clara, Calif.

Filed Dec. 30, 1987, Ser. No. 139,450
Int. Cl.[4] G11C *7/00*
U.S. Cl. 365—189.02 **11 Claims**



1. An erasable programmable logic device (EPLD) having a programmable memory array coupled to receive a plurality of input signals and, by providing a plurality of output signals which depend on said input signals and information stored in said memory array, said output from said memory array coupled to a plurality of macrocells, wherein product terms are shared between adjacent macrocells, each macrocell comprising:

a first OR'ing means coupled to receive a first predetermined number of output lines from said memory array;

a second OR'ing means coupled to receive a second predetermined number of output lines from said memory array;

said first and second OR'ing means each for providing an OR'ing function of its coupled predetermined number of output lines from said memory array;

a first multiplexor coupled to said first OR'ing means for receiving a first OR'ed output of said first OR'ing means;

a second multiplexor coupled to said second OR'ing means for receiving a second OR'ed output of said second OR'ing means;

said first OR'ed output of said first OR'ing means is also coupled to a subsequently adjacent macrocell;

said second OR'ed output of said second OR'ing means also is coupled to a previously adjacent macrocell;

a third multiplexor coupled to receive a second OR'ed output of said second OR'ing means of said subsequently adjacent macrocell; and

a fourth multiplexor coupled to receive a first OR'ed output of said first OR'ing means of said previously adjacent macrocell;

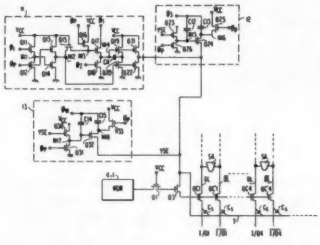
a third OR'ing means coupled to receive outputs of said first, second, third and fourth multiplexors such that each of said OR'ed outputs is coupled to said third OR'ing means when said respective multiplexor is selected;

an input/output (I/O) circuit coupled to receive an output of said third OR'ing means, said I/O circuit for emulating logic functions and providing an output from said macrocell.

4,878,201
SEMICONDUCTOR MEMORY DEVICE HAVING AN IMPROVED TIMING SIGNAL GENERATOR FOR THE COLUMN SELECTION CIRCUIT

Kazuo Nakaizumi, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan

Filed Jan. 28, 1988, Ser. No. 149,269
Claims priority, application Japan, Jan. 28, 1987, 62-19298; Jan. 28, 1987, 62-19303
Int. Cl.[4] G11C *7/00, 11/40*
U.S. Cl. 365—203 **4 Claims**



1. A memory device comprising an output terminal, means receiving a power voltage, a first drive circuit coupled to said output terminal, said first drive circuit making said output terminal approximately the potential of said power voltage in response to a first timing signal, a first capacitive boost circuit coupled to said output terminal, said first capacitive boost circuit raising the potential at said output terminal, which is approximately at the potential of said power voltage, above said power voltage in response to a second timing signal, said second timing signal being generated after the generation of

said first timing signal, and a second capacitive boost circuit coupled to said output terminal, said second capacitive boost circuit operatively raising the potential at said output terminal above said power voltage in response to a third timing signal, said third timing signal being generated only in a write mode and after generation of said second timing signal.

4,878,202

CHARGE-COUPLED DEVICE

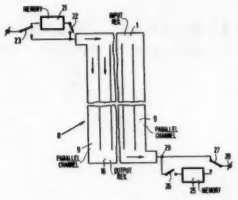
Arie Slob, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Apr. 28, 1988, Ser. No. 187,612

Claims priority, application Netherlands, May 11, 1987, 8701110

Int. Cl.[4] G11C *27/00*; H01L *29/76*

U.S. Cl. 365—183 **10 Claims**



1. A charge-coupled device comprising a memory of the series-parallel-series type having a series input register and a series output register as well as a parallel section located between these registers, characterized in that the series input register is provided with an input stage comprising an additional memory, in which, when the series input register is filled with a first subline comprising a plurality of bits, at least the first bit of a second subline comprising a plurality of bits can be stored, while the bits of the first subline are transferred to the parallel section, after which the bits of said second subline are stored in the additional memory and the remaining bits of the second subline can be read into the series input register.

4,878,203

SEMICONDUCTOR NON-VOLATILE MEMORY WITH CUT-OFF CIRCUIT WHEN LEAKAGE OCCURS

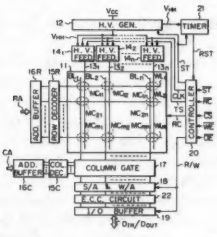
Hideki Arakawa, Yokohama, Japan, assignor to Fujitsu Limited, Kawasaki, Japan

Filed Sep. 19, 1988, Ser. No. 247,130

Claims priority, application Japan, Sep. 19, 1987, 62-233651

Int. Cl.[4] G11C *7/00*

U.S. Cl. 365—226 **11 Claims**



1. A semiconductor non-volatile memory device comprising:

a memory cell array having a memory cell including a non-volatile memory cell portion, said memory cell being provided at each intersection of a plurality of word lines and a plurality of bit lines;

a high voltage generating circuit being supplied with an external power supply voltage and generating a high voltage required for storing data in said non-volatile memory cell portion;

a plurality of high voltage wirings, each being allocated to each of a corresponding plurality of blocks divided into units of a predetermined number of cells in said memory cell array and being commonly connected to all of said cells in a corresponding block; and

a plurality of high voltage feeding circuits operatively connected between said plurality of high voltage wirings and said high voltage generating circuit, each of said high voltage feeding circuits feeding said high voltage from said high voltage generating circuit to said cells in said corresponding block, and when a leak occurs in any one of said cells in said corresponding block, stopping the feed of said high voltage to said corresponding block.

4,878,204

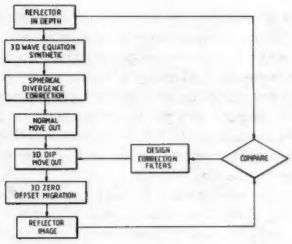
METHOD FOR TRUE-AMPLITUDE DIP MOVEOUT CORRECTION

James L. Black, and Cameron B. Wason, both of Plano, Tex., assignors to Geophysical Service, Inc., Dallas, Tex.

Filed Oct. 28, 1988, Ser. No. 264,090

Int. Cl.[4] G01V *1/36*

U.S. Cl. 367—53 **3 Claims**



1. A method for carrying out true-amplitude dip moveout on seismic data which comprises:

selecting a reflectivity and dip for a theoretical dipping layer in three dimensions;

generating a synthetic dataset corresponding to reflection from the theoretical dipping layer using a known deconvolved source wavelet and a conventional three dimensional scalar wave equation;

correcting the synthetic dataset for spherical divergence to provide a spherical divergence corrected synthetic dataset;

correcting the spherical divergence corrected synthetic dataset for normal moveout to provide a normal moveout corrected synthetic dataset;

correcting the normal moveout corrected synthetic dataset for dip moveout using an extra degree of freedom in the dip moveout equation to provide a corrected synthetic dataset;

performing zero-offset migration on the corrected synthetic dataset to provide a migrated seismic image;

comparing the migrated seismic image with a known true-amplitude image derived from the known reflectivity and the known source wavelet from the theoretical dipping layer;

adjusting the migrated seismic image to substantially correspond to the known true-amplitude image by adjustment of the extra degree of freedom to provide a set of correction filters;

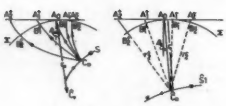
applying the correction filters during dip moveout correction operations on data from seismic surveys.

4,878,205

METHOD OF ANALYZING THE STRUCTURE OF A MEDIUM, PARTICULARLY USEFUL FOR SEISMIC PROSPECTING

Boris Gelchinsky, 12/16 Mivtzah Yonatan, Kfar Save 44 221, Israel

Filed Jul. 11, 1988, Ser. No. 217,269
Claims priority, application Israel, Jul. 23, 1987, 83306
Int. Cl.[4] G01V *1/36*
U.S. Cl. 367—61 **13 Claims**



1. Method of analysing the structure of a medium by means of waves reflected by inner interfaces, comprising

(a) generating multiple coverage data represented by traces corresponding to a plurality of source-receiver pairs distributed according to an asymetric polynomial distribution with respect to a predetermined central point with optimal parameters which provide that all reflected events of such traces correspond to the same common reflecting point on a reflecting interface;

(b) correcting the recorded traces according to an optimal time delay correction which converts all reflected events to the same phase and which depends on the local parameters of wave propagation velocity Vo at the reference level, and of radius of curvature r_o of the wavefront emitted by a fictitious source located at the common reflecting point and coming to the central point at an angle of entry βo;

(c) stacking said corrected recorded traces;

(d) repeating (a), (b) and (c) for a plurality of predetermined common reflecting points to produce a plurality of the stacked traces; and

(e) utilizing said stacked traces and parameters ro and βo as a function of said predetermined central point, and the time t_o of registration of the data at this point for determining the structure of the medium.

4,878,206

METHOD AND APPARATUS FOR FILTERING NOISE FROM DATA SIGNALS

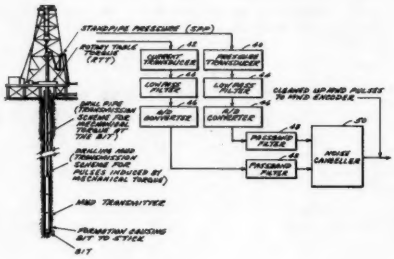
Donald S. Grosso, West Hartford; Thomas M. Bryant, Avon, and Mitchell S. Gershonowitz, Wallingford, all of Conn., assignors to Teleco Oilfield Services Inc., Meriden, Conn.

Filed Dec. 27, 1988, Ser. No. 290,506
Int. Cl.[4] G01V *1/40*
U.S. Cl. 367—83 **20 Claims**

1. A method of filtering noise from a data signal that is telemetered through well drilling fluid in a rotary drill string comprising the steps of:

measuring vibration on the drill string at or near the surface to define a reference signal;

measuring the standpipe pressure of the drilling fluid in the drillstring to define a standpipe pressure (SPP) signal; and



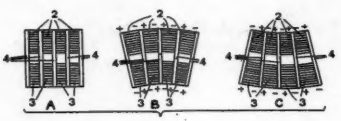
subtracting the reference signal from said SPP to define a data signal having improved signal to noise ratio.

4,878,207

COMPOSITE SONAR TRANSDUCER FOR OPERATION AS A LOW FREQUENCY UNDERWATER ACOUSTIC SOURCE

Zdenek Janders, Ashfield, and Ian R. Bedwell, Randwick, both of Australia, assignors to Plessey Australia Pty. Ltd., Meadowbank, Australia

PCT No. PCT/AU87/00372, § 371 Date Sep. 7, 1988, § 102(e) Date Sep. 7, 1988, PCT Pub. No. WO88/03739, PCT Pub. Date May 19, 1988
PCT Filed Nov. 4, 1987, Ser. No. 242,192
Claims priority, application Australia, Nov. 7, 1986, PH8951
Int. Cl.[4] H04R *17/00*
U.S. Cl. 367—155 **16 Claims**



1. A composite sonar transducer useful as an underwater acoustic source comprising:

a head formed by a series of elemental cells of piezoceramic elements, each elemental cell comprising a cell support and first and second stacks of said piezo-ceramic elements, said first and second stacks being carried by said support, said elemental cells being positioned so as to form a planar array of elemental cells to form said head;

said first and second stacks being arranged along two separate planes positioned about a central plane of said head, said of said first stack being positioned in a polar orientation opposite to those of said second stack;

nodal supports positioned on said central plane between end members on said planar array; and

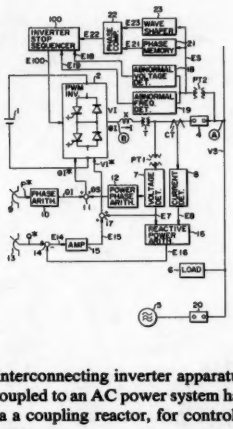
support members for said head and means to connect the stacks of said piezo-ceramic elements into an electrical circuit.

4,878,208

VOLTAGE-PHASE RESPONSIVE, INVERTER DISABLE CIRCUIT FOR SYSTEM INTERCONNECTION

Nagataka Seki; Kiyoshi Ogawa, both of Tokyo, and Kihei Nakajima, Yokohama, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Sep. 29, 1988, Ser. No. 250,853
Claims priority, application Japan, Sep. 30, 1987, 62-246143
Int. Cl.[4] H02J 3/06
U.S. Cl. 307—87 11 Claims



1. A system interconnecting inverter apparatus comprising:

an inverter, coupled to an AC power system having a system voltage, via a coupling reactor, for controlling power of said AC power;

system phase detection means for detecting a system phase signal indicating a phase of the system voltage of said AC power system in real time;

comparison phase detection means for detecting a signal indicating the phase of the system voltage of said AC power system with a predetermined delay time, and temporarily storing a result of the detection to provide a comparison phase signal; and

stop means, coupled to said inverter, said system phase detection means, and said comparison phase detection means, for phase-comparing the system phase signal and the comparison phase signal and, when a phase difference between the system phase signal and the comparison phase signal exceeds a predetermined value, stopping the operation of said inverter.

4,878,209

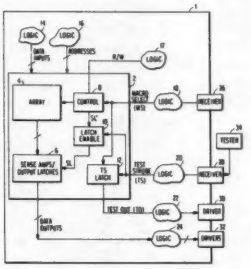
MACRO PERFORMANCE TEST

Robert W. Bassett, Essex Junction; William R. Griffin, Shelburne; Susan A. Murphy, South Burlington; John G. Petrovick, Jr., Colchester; James R. Varner, Essex Junction, all of Vt., and Dennis R. Whittaker, Fairfax, Va., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Mar. 17, 1988, Ser. No. 169,544
Int. Cl.[4] G04F 8/00; G01R 15/12; G06F 11/14
U.S. Cl. 368—113 14 Claims

1. A semiconductor device having external chip circuitry, an array, means for receiving an input signal for enabling the array, and output data latches associated with the array, the device comprising:

logical gate means connected to the output data latches, thereby controlling an access time of the array; and



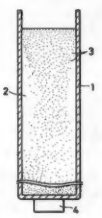
means for determining an on-chip delay time between a test signal and the input signal.

4,878,210

VISUALIZING METHOD FOR THREE DIMENSIONAL STANDING WAVE SOUND FIELD

Hideto Mitome, Tsukuba, Japan, assignor to Agency of Industrial Science & Technology, Ministry of International Trade & Industry, Tokyo, Japan

Filed Oct. 17, 1988, Ser. No. 258,763
Claims priority, application Japan, Nov. 19, 1987, 62-292640
Int. Cl.[4] H04B 1/02
U.S. Cl. 367—137 8 Claims



1. A visualizing method for three dimensional standing wave sound field comprising:

charging into a container equipped with an ultrasonic wave transmitter a medium consisting essentially of a liquid and a plurality of fine particles of the same density as said liquid, and

causing said ultrasonic wave transmitter to transmit into said container ultrasonic waves of a frequency capable of forming a standing wave,

whereby said fine particles ar caused to move to positions where the amplitude of the sound pressure is minimum and the sound pressure distribution of the three dimensional standing wave sound field is visualized by the distribution of the fine particles.

4,878,211

METHOD AND APPARATUS FOR CORRECTING THE LOOP GAIN OF A SERVO LOOP IN ACCORDANCE WITH MEASUREMENTS DURING OPEN-LOOP OPERATION

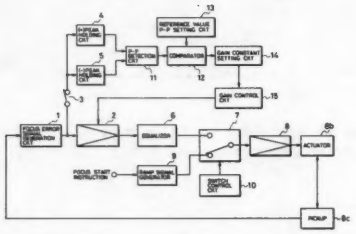
Masanori Suzuki, and Kiyoshi Tateishi, both of Saitama, Japan, assignors to Pioneer Electronic Corporation, Tokyo, Japan

Filed May 26, 1987, Ser. No. 53,790

Claims priority, application Japan, May 26, 1986, 61-121677; Sep. 19, 1986, 61-221680

Int. Cl.[4] G11B 7/09

U.S. Cl. 369—44 15 Claims



1. A method of correcting a loop gain of a servo loop, said servo loop being of the type wherein an error signal is derived from signal representing the condition of an object and wherein said object is driven toward a desired condition in accordance with said error signal, said method comprising the steps of:

opening a servo loop;

changing the condition of said object to cause said error signal to pass through an upper peak representing a maximum error in a first direction and a lower peak of said error signal representing a maximum error in a second direction;

detecting a peak-to-peak value of an error signal of said servo loop while said servo loop is open, wherein said peak-to-peak value represents the difference between said upper and lower peaks of said error signal;

adjusting an amplification gain in accordance with said detected peak-to-peak value;

closing said servo loop; and

operating said closed servo loop including amplifying said error signal by said adjusted amplification gain.

4,878,212

OPTICAL RECORDING MEDIUM COMPRISING A MICROPOROUS POLYMER RECORDING LAYER

James E. Kuder, Fanwood, N.J., assignor to Hoechst Celanese Corporation, Somerville, N.J.

Continuation of Ser. No. 657,918, Oct. 5, 1984, abandoned. This application Feb. 22, 1988, Ser. No. 161,373

The portion of the term of this patent subsequent to Jan. 13, 2004, has been disclaimed.

Int. Cl.[4] G11B 7/00

U.S. Cl. 369—100 20 Claims

1. An optical recording medium for the recording of information comprising:

(i) an opaque microporous polymer layer comprised of a microporous polymer film which has been produced by a stretching technique such that the film structure contains an inherent strain, the pores of the microporous polymer film having an effective pore size less than 500 Angstroms, and wherein the microporous polymer layer collapses upon transmission of heat thereto, and

(ii) an energy-absorbing material situated with regard to the microporous polymer so as to be able to transmit heat thereto, and which upon irradiation with a light source transmits thermal energy to the microporous polymer layer to cause a collapse in the microporous structure of said microporous polymer layer in those areas irradiated.

4,878,213

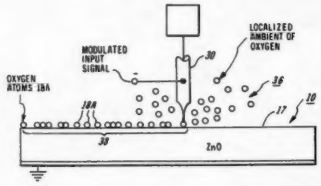
SYSTEM FOR RECORDING AND READOUT OF INFORMATION AT ATOMIC SCALE DENSITIES AND METHOD THEREFOR

Benjamin Kazan, Los Altos, and Stig B. M. Hagstrom, Menlo Park, both of Calif., assignors to Xerox Corporation, Stamford, Conn.

Continuation of Ser. No. 651,396, Sep. 14, 1984, abandoned. This application Oct. 3, 1988, Ser. No. 253,165

Int. Cl.[4] G11B 9/00

U.S. Cl. 369—126 18 Claims



1. In the method of atomic scale recording and readout of information wherein a readout electrode means is scanned across the surface of a carrier having adhesion properties for an associated atomic particle, the pattern of said particles formed on said carrier representative of recorded information and comprising the steps of

determining the topography of said carrier surface prior to recording information on the surface of said carrier by applying a voltage to said readout electrode means creating a tunnel current between said electrode means and the surface of said carrier and scanning said electrode across said carrier surface, the nonrecord output signal at said electrode comprising variations of said tunnel current at said electrode representative of said carrier surface topography,

selectively supply said atomic particles to the surface of said recording electrode means by inducing said particle to adhere to the surface thereof, the pattern of said atomic particles on the surface of said carrier representative of recorded information, determining again the topography of said carrier surface by applying a voltage to said readout electrode means creating a tunnel current between said electrode means and the surface of said carrier and scanning said electrode across said carrier surface, the record output signal at said electrode comprising variations of said tunnel current representative of the presence or absence of said atomic particles on the surface of said carrier, and

producing a resultant readout information signal having high signal-to-noise ratio by taking the identically scanned difference between said record output signal and said nonrecord output signal.

4,878,214

OBJECTIVE LENS SUPPORTING DEVICE FOR OPTICAL PICKUP

Hiroaki Hinotani, Kakuda, Japan, assignor to Alps Electric Co., Ltd., Japan

Filed May 26, 1988, Ser. No. 199,103

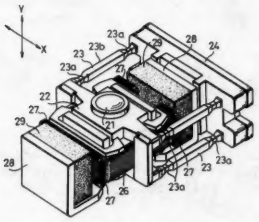
Claims priority, application Japan, Sep. 8, 1987, 62-138086[U]

Int. Cl.[4] G11B 7/08; G02B 7/02

U.S. Cl. 369—256 4 Claims

1. In an objective lens supporting device for an optical pickup including an objective lens opposed to an optical disc,

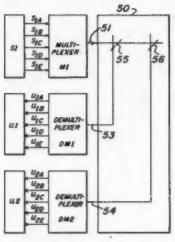
a lens holder for holding said objective lens, a plurality of supporting rods formed of elastic material and arranged in parallel to each other, said lens holder being operatively supported by said supporting rods, and a driving mechanism for driving said lens holder in both a direction of an optical axis of said objective lens and a direction along an information recorded surface of said optical disc; the improvement comprising a pair of neck portions formed at both end portions of said each supporting rod, said each neck portion having a section such that a geometrical moment of inertia with respect to a first axis intersecting a primary axis and extending in said direction of said optical axis of said objective lens is equal to a geometrical moment of inertia with respect to a second axis intersecting said primary axis and extending in said direction along said information recorded surface of said optical disc.



4,878,215
SIGNAL SWITCHING SYSTEM

William P. Rogers, Collingswood, N.J., assignor to Telenex Corporation, Mount Laurel, N.J.

Filed Mar. 20, 1987, Ser. No. 28,604
Int. Cl.[4] H04Q *11/04;* H04J *3/12*
U.S. Cl. 370—58.1 3 Claims



1. A signal-switching system, comprising:

a plurality of groups of input signal lines each carrying on one of its lines a data signal and on a plurality of its other lines signals relating to said data signal

a plurality of time multiplexers each connected to a corresponding different one of said groups of input signal lines and each producing a stream of time-multiplexer serial-bit signals corresponding to the signals on said corresponding groups of input signal lines;

a plurality of serial-to-parallel time demultiplexing means each responsive to any of said streams of time-multiplexed serial signals supplied thereto to produce a corresponding group of separate reproduced parallel signals substantially the same as those carried by that one of said groups of input lines connected thereto;

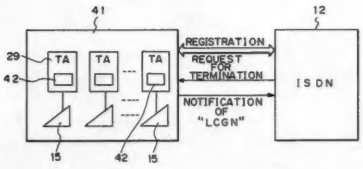
cross-point signal switching means connected between all of said multiplexers and all of said demultiplexers and controllable to supply any one of said streams of serial-bit signals directly, and without storage, substantially instantaneously from the multiplexer producing it to any selected one of said plurality of time-demultiplexing means without changing the order of bits in said streams; and

means for supplying said reproduced parallel signals from each of said time-demultiplexing means to a corresponding one of said groups of signal utilization lines.

4,878,216
METHOD FOR MANAGEMENT OF LOGICAL CHANNELS FOR ISDN PACKET SERVICE

Hideo Yunoki, Tokyo, Japan, assignor to Fujitsu Limited, Kawasaki, Japan

Filed Mar. 2, 1988, Ser. No. 163,096
Claims priority, application Japan, Mar. 2, 1987, 62-045167
Int. Cl.[4] H04M *3/00*
U.S. Cl. 370—60 14 Claims



1. A method for management of logical channels for packet service in an integrated services digital network used for packet communications between subscribers, where each subscriber has a number of pieces of data terminal equipment and communication packets are handled via terminal adapters, each terminal adapter provided for one piece of the data terminal equipment, said method comprising the steps of:

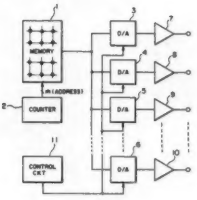
(a) allotting a logical channel group number for each piece of the data terminal equipment; and

(b) storing the logical channel group number in logical channel management memories, each corresponding to one piece of the data terminal equipment.

4,878,217
DATA OUTPUTTING DEVICE

Norimasa Nakamura, and Satoshi Kishimoto, both of Saitama, Japan, assignors to Pioneer A afone Manufacturing Corporation, Saitama, Japan

Filed Feb. 1, 1988, Ser. No. 150,855
Claims priority, application Japan, Jan. 30, 1987, 62-20116
Int. Cl.[4] H04J *3/02*
U.S. Cl. 370—77 5 Claims



1. A data outputting device for outputting a plurality of data equal in content and whose beginnings are shifted in time from one another, comprising:

a memory for storing said data in a digital mode;

a counter for successively providing, during each of a plural-

ity of predetermined periods, memory addresses whose number corresponds to a number of channels employed;

a selection circuit means for selectively providing to said channels said data stored in said memory and read out in accordance with said addresses provided by said counter.

4,878,218

DATA TRANSMISSION METHOD AND DATA TRANSMISSION SYSTEM FREE FROM LOCAL TRAFFIC JAM

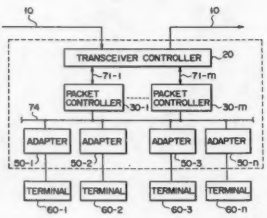
Ikuko Takada, Tokyo, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Aug. 24, 1988, Ser. No. 235,553

Claims priority, application Japan, Aug. 31, 1987, 62-216659; Jun. 10, 1988, 63-142909

Int. Cl.[4] H04J *3/26*

U.S. Cl. 370—94 **20 Claims**



1. A data transmission system which effectively utilizes channels of a multiplexed transmission line, comprising:

a plurality of packet control means, each provided for a channel each for receiving packets to store the received packets, each packet having a priority, for calculating an average priority of the stored packets and for transmitting the stored packets through a corresponding channel; and

adapter means for selecting as a destination packet control means one of said plurality of packet control means, in accordance with a priority of an object packet to be transmitted and the average priorities calculated by said plurality of packet control means, and for transmitting the object packet to said destination packet control means.

4,878,219

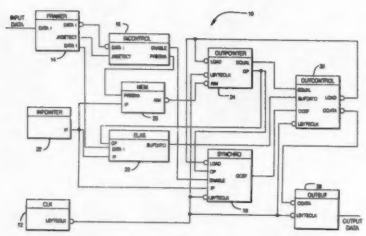
METHOD AND APPARATUS FOR NODES IN NETWORK TO AVOID SHRINKAGE OF AN INTERFRAME GAP

Charles W. Kaufman, Northboro; Mark F. Kempf, Stow, and Jerry D. Hutchison, Littleton, all of Mass., assignors to Digital Equipment Corporation, Maynard, Mass.

Filed Apr. 28, 1988, Ser. No. 187,208

Int. Cl.[4] H04J *3/02, 3/24;* H04B *3/36*

U.S. Cl. 370—97 **60 Claims**



1. An output controller in a repeater node for controlling data transfers in a data communication system, the data communication system including a plurality of nodes coupled in a network for transferring frames of data from a source node to a destination node through a plurality of repeater nodes, wherein the repeater node receives a plurality of bytes in a frame from an upstream node, stores the plurality of bytes in an elasticity buffer, and transmits the plurality of bytes in the frame to a downstream node, wherein a last byte of a preceding frame and a starting delimiter for a subsequent frame are separated by a preamble including at least a minimum number of idle bytes, wherein each node in the network is operated by an independent local clock, and wherein the repeater node includes an input controller, the output controller comprising:

means coupled to the elasticity buffer for transmitting bytes to the downstream node in response to a local clock signal;

means coupled to the transmitting means for indicating an idle byte is being transmitted to the downstream node;

means coupled to the idle byte indicating means for counting the number of idle bytes being transmitted to the downstream node;

control means coupled to the counting means and responsive to an indication from the input controller of receipt of the starting delimiter for the subsequent frame, for asserting a control signal to enable transmission of the starting delimiter to the downstream node in response to an idle byte count indicating that more than a threshold number of idle bytes is being transmitted to the downstream node, and for not asserting the control signal to delay transmission of the starting delimiter in response to an idle byte count indicating that the threshold number of idle bytes is being transmitted to the downstream node; and

means coupled to the control means and the transmitting means for transmitting an additional idle byte to the downstream node in response to deassertion of the control signal at times when an equal signal is received indicating the starting delimiter is ready to be output.

4,878,220

SEMICONDUCTOR MEMORY DEVICE

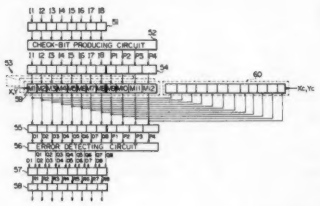
Kiyokazu Hashimoto, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan

Filed Nov. 19, 1987, Ser. No. 123,008

Claims priority, application Japan, Nov. 19, 1986, 61-277126

Int. Cl.[4] G06F *11/10*

U.S. Cl. 371—40.1 **9 Claims**



1. A semiconductor memory device fabricated on a single semiconductor substrate and having a write-in mode, a read-out mode and a diagnostic mode, comprising:

(a) a check-bit producing circuit operative to produce check bits based on data bits representing a piece of data information supplied from the outside of said semiconductor memory device in said write-in mode, said check-bits being used to decide whether or not any error is introduced in said data information in said semiconductor memory device, said error being represented by an error bit;

(b) a plurality of memory cell groups each capable of storing the data bits representing said data information and the check bits produced by said check-bit producing circuit;

(c) an error detecting circuit operative to identify at least one error bit in said data bits read out from one of said memory cell groups or in dummy bits on the basis of the data bits representing said data information stored in said one of said memory group and said check bits or alternatively on the basis of said dummy bits and to produce an output signal consisting of a plurality of data bits and representing said at least one error bit, if any, in said read-out mode or said diagnostic mode;

(d) an error correction circuit supplied with the data bits representing said data information stored in said one of said memory cell group, said check bits in said one of said memory cell group and said output signal produced by said error detecting circuit or alternatively with said dummy bits and said output signal and operative to correct said at least one error bit in said read-out mode or said diagnostic mode; and

(e) a test pattern producing circuit operative to supply said error detecting circuit and said error correction circuit with said dummy bits having said error bit and check bits which are produced on the basis of said data bits without said error bit, said test pattern producing circuit supplying the dummy bits to said error detecting circuit and said error correction circuit while bypassing any of said memory cell groups in said diagnostic mode.

4,878,221

ERROR-CORRECTING DECODER FOR RAPIDLY DEALING WITH BUFFER OVERFLOW

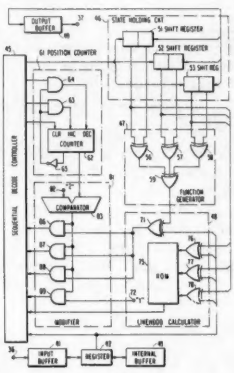
Michio Shimada, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan

Filed Dec. 28, 1987, Ser. No. 138,273

Claims priority, application Japan, Dec. 25, 1986, 61-310331

Int. Cl.[4] G06F *11/10*

U.S. Cl. 371—43 **6 Claims**



1. An error-correcting decoder for use as a counterpart of an error-correction encoder for encoding a sequence of original information symbols into a sequence of original code symbols by production of original redundancy symbols in accordance with a predetermined rule and by addition of said redundancy symbols to the respective information symbols to form the respective code symbols, said decoder including a sequential decode controller for executing a sequential decoding algorithm on an input sequence of received code symbols corresponding to the respective original code symbols to produce a local sequence of presumed information symbols, an encoder replica for encoding said local sequence into a replica output sequence of presumed code symbols by production of presumed redundancy symbols in accordance with said predetermined rule and by addition of said presumed redundancy symbols to the respective presumed information symbols to form the respective presumed code symbols, and a likelihood calculator responsive to said input and said replica output sequences for calculating likelihoods which said presumed code symbols have relative to the respective received code symbols, said likelihood calculator thereby producing a likelihood signal representative of said likelihoods, wherein the improvement comprises:

a position counter coupled to said sequential decode controller for counting position counts for the respective presumed information symbols in said local sequence to produce a count signal representative of said position counts;

modifying means responsive to said count signal for modifying said likelihood signal into a modified signal by giving a predetermined value to the likelihoods calculated for the respective presumed redundancy symbols until said position counts reach a predetermined count after initialization of said position counter; and

supplying means for supplying said modified signal to said sequential decode controller to make said modified signal control execution of said sequential decoding algorithm.

4,878,222

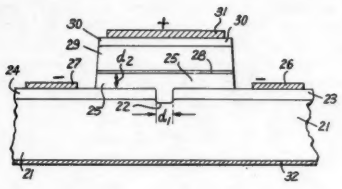
DIODE LASER WITH IMPROVED MEANS FOR ELECTRICALLY MODULATING THE EMITTED LIGHT BEAM INTENSITY INCLUDING TURN-ON AND TURN-OFF AND ELECTRICALLY CONTROLLING THE POSITION OF THE EMITTED LASER BEAM SPOT

David J. Lawrence, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Aug. 5, 1988, Ser. No. 228,430

Int. Cl.[4] H01S *3/19*

U.S. Cl. 372—48 **30 Claims**



1. A heterostructure combined semiconductor diode laser and junction field effect transistor device having a centrally located conduction path from a central exposed contact on its top surface through a centrally located semiconductor active laser region disposed between upper and lower opposite conductivity type cladding regions formed over a semiconductor substrate of the same conductivity type as the lower cladding region and having at least one laser stripe channel filled with a semiconductor composition of the same conductivity type as the lower cladding region and formed in the top surface of the substrate which supports the vertically arrayed cladding and active regions and an exposed contact on its underside; characterized in that:

first and second semiconductor barrier regions of opposite conductivity type from the substrate are interposed on opposite sides of the laser stripe channel between the lower cladding region and the substrate and electrically isolated one from the other;

first and second exposed contacts are formed on the top surfaces of the respective first and second barrier regions;

means for applying independently controlled bias potentials to the respective barrier regions via the first and second barrier layer contacts whereby depletion regions of independently controlled extent are established by the barrier regions in the laser stripe channel for controlling the magnitude of the current through the central conduction

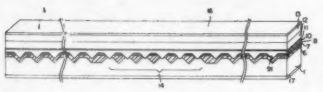
path to thereby modulate the intensity of a laser light beam produced in the active region.

4,878,223

SEMICONDUCTOR LASER ARRAY DEVICE

Taiji Morimoto, Nara; Hiroyuki Hosoba, Tenri; Mitsuhiro Matsumoto, Nara; Mototaka Taneya, Tsukuba, and Sadayoshi Matsui, Tenri, all of Japan, assignors to Sharp Kabushiki Kaisha, Japan

Filed Jul. 26, 1988, Ser. No. 224,558
Claims priority, application Japan, Jul. 28, 1987, 62-188279
Int. Cl.[4] H01S 3/19
U.S. Cl. 372—50 3 Claims



1. In a semiconductor laser array device comprising a substrate with a plurality of first grooves with a given pitch, and a current blocking layer with a conductivity type that is different from that of said substrate and that is disposed on the groove-side surface of said substrate, an improved structure wherein:

said current blocking layer has a plurality of second grooves on its crystal growth surface that is opposite to the groove-side surface of said substrate;

a heterostructure multi-layered crystal is disposed on said current blocking layer, said multi-layered crystal having an active layer for laser oscillation; and

the position of each of the first grooves is shifted half a pitch from that of each of the second grooves in a central area elongated substantially along the laser oscillation direction, and wherein each of the first grooves is positioned over each of the second grooves in side areas, said second grooves reaching said substrate through said current blocking layer in said central area, which results in current paths.

4,878,224

DYE LASERS

James E. Kuder, Fanwood; James L. McGinnis, Tewksbury Twp.; Harris A. Goldberg, Colonia; Timothy R. Hart, Hoboken, and Tessie M. Che, Westfield, all of N.J., assignors to Hoechst Celanese Corporation, Somerville, N.J.

Filed Sep. 16, 1988, Ser. No. 245,090
Int. Cl.[4] H01S 3/22
U.S. Cl. 372—53 24 Claims

1. A dye laser consisting of a composite composition of an inorganic oxide glass monolith with a microporous structure containing an incorporated solution comprising a solvent component and a lasable dye component, and wherein the glass monolith has sealed outer surfaces.

4,878,225

CONTROLLING APPARATUS FOR LASER DIODE

Masahiko Aiba, Nara, and Yukio Mizuno, Yamatokoriyama, both of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

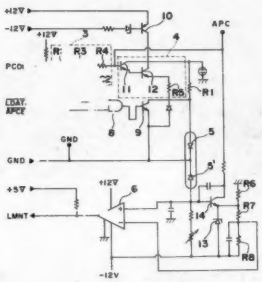
Continuation of Ser. No. 89,532, Aug. 26, 1987, abandoned. This application Mar. 20, 1989, Ser. No. 326,453
Claims priority, application Japan, Aug. 26, 1986, 61-200404; Aug. 27, 1986, 61-202467
Int. Cl.[4] H01S 3/00
U.S. Cl. 372—38 13 Claims

1. A laser diode controlling apparatus for controlling a current supplied to a laser diode that is used for printing in a laser printing apparatus provided with a monitor that monitors light intensity of the laser diode by developing a monitoring signal related thereto, comprising:

comparing means for comparing the monitoring signal developed by the laser diode with a predetermined reference intensity signal and developing a reference signal in response thereto;

central processing means for developing a pulse signal representative of a desired light intensity level in response to said reference signal received from said comparing means;

duty cycle controlling means responsive to said pulse signal for developing a duty cycle control signal having a duty



cycle related to the current to be supplied to the laser diode;

smoothing means for developing a DC analog signal by smoothing said duty cycle control signal; and

current conversion means for supplying a drive current to the laser diode related to the DC analog signal, the laser diode developing light intensity related to said drive current;

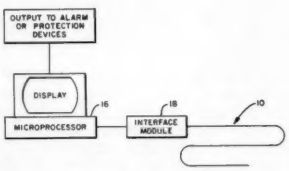
said central processing means developing said pulse signal and thereby enabling adjustment of light intensity of the laser diode only during an initialization period preceding printing by the laser diode.

4,878,226

MULTIPLE POINT REMOTE TEMPERATURE SENSING

Bryan K. McQuoid, Simsbury, Conn.; Earl J. Charlson, and Huber Graham, both of Columbia, Mo., assignors to Combustion Engineering, Inc., Windsor, Conn. and Curators of the University of Missouri, Columbia, Mo.

Continuation of Ser. No. 12,269, Feb. 9, 1987, abandoned. This application Apr. 22, 1988, Ser. No. 185,105
Int. Cl.[4] G01K 7/16, 13/00
U.S. Cl. 374—166 29 Claims



1. Apparatus for sensing the temperature at a plurality of remotely located points in a predetermined sequence comprising:

elongated cable means, said cable means having a pair of opposite ends and at least a pair of access terminals at a first of the said ends thereof, said cable means including a conductor extending from each of said access terminals to the second end thereof, said cable means further including

plural spatially separated inactive segments positioned along the length thereof, said inactive segments being comprised of material which is an electrical and thermal insulator;

a plurality of spatially separated temperature responsive electrical circuit components carried by said cable means, said components being located along said cable means in regions between said inactive segments thereof, each of said components providing a signal which varies as a function of local ambient temperature;

a plurality of sensor circuits, each of said sensor circuits being juxtapositioned to and electrically connected to an associated one of said temperature responsive components, said sensor circuits each having a unique address and being responsive to an interrogating signal which includes the unique address;

means connecting each of said sensor circuits to at least a first of said cable means conductors whereby information commensurate with the signal provided by said temperature responsive components may be sampled via the sensor circuit associated therewith in response to an interrogating signal which includes the sensor circuit address; and

address signal generator means connected to said first cable means conductor via a cable means access terminal for generating interrogating signals for said sensor circuits in a predetermined sequence, each of said interrogating signals including the address of a sensor circuit whereby the information commensurate with the signals provided by said temperature responsive components will be individually available on said first cable means conductor.

4,878,227

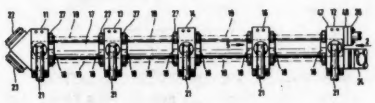
DEVICE FOR A MODULAR POWER LASER

Frank Ackermann, Hohenzollerastr. 13, 4000 Stuttgart; Reinhard Wollermann-Windgasse, Höhenstr. 13, 7143 Vaihingen/-Enz-Riet, and Bernd Faller, Hirschlanderstr. 2, 7257 Ditzingen, all of Fed. Rep. of Germany

Filed Nov. 2, 1987, Ser. No. 115,419

Int. Cl.[4] H01S *3/08*

U.S. Cl. 372—107 **5 Claims**



1. A device for a modular CO2 laser having

two end-flange devices,

at least one intermediate-flange device,

at least one metallic support tube that is resistant to bending and has two end regions fixedly mounted in said two end-flange devices and a central region to which said intermediate-flange device is secured,

gas pipes between said two end-flange devices, said gas pipes having a coefficient of thermal expansion different from that of said metallic support tube and having end regions mounted in said flange devices so as to be floating in terms of thermal expansion,

at least one at most partially-transmitting mirror device at at least one of said end-flange devices, said mirror device comprising a mirror and a massive support plate carrying a mounting for said mirror,

an adjusting-screw device, which comprises a reference position and two metal screws, said reference position forming an origin of X axis and Y axis coordinates and said two metal screws being situated in said X axis and Y axis respectively, said mirror being adjustable by rotation of at least one of said screws, and comprising the improvement wherein:

(a) the metal of said metallic support tube has a coefficient of thermal expansion that is not particularly low, and

(b) the metal of said metal screws has a particularly low coefficient of thermal expansion.

4,878,228

MICROWAVE RELAY STATION HAVING A COMMON STANDBY CHANNEL FOR SIGNALS OF DIFFERENT TYPES OF MODULATION

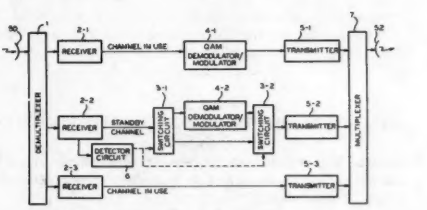
Kunihiko Takahashi, Tokyo, Japan, assignor to Nec Corporation, Japan

Filed Jul. 1, 1986, Ser. No. 880,789

Claims priority, application Japan, Jul. 4, 1985, 60-145715

Int. Cl.[4] H04B *3/36, 7/17*

U.S. Cl. 375—3 **15 Claims**



1. A microwave relay station comprising: at least first and second channels for respectively transmitting two different types of signals which are QAM and FM signals, respectively; a standby transmission channel having first and second means for respectively transmitting said two different types of signals; detection means for identifying the type of said signals appearing in said standby channel, said detection means comprising three bandpass filters respectively tuned to high, low and center frequencies of signals passing through said standby channel; measuring means responsive to the outputs of said bandpass filters for determining amplitudes of the signals at said high, low, and center frequencies; selection means responsive to said detection means for selecting one of said first and second means, whereby said standby channel becomes dedicated to the transmission of said identified type of signal; and control means responsive to said determined amplitudes for controlling said selection means.

4,878,229

FAST FRAME AND PHASE SYNCHRONIZATION APPARATUS

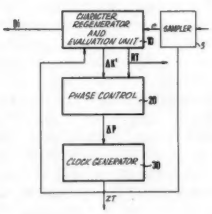
Kalman Szechenyi, Spiegelberg, Fed. Rep. of Germany, assignor to Alcatel N.V., Amsterdam, Netherlands

Filed Jun. 7, 1988, Ser. No. 203,672

Claims priority, application Fed. Rep. of Germany, Jun. 12, 1987, 3719659

Int. Cl.[4] H04L *7/08*

U.S. Cl. 375—14 **5 Claims**



1. Synchronization apparatus responsive to a digital stream

of character data which is received over a transmission path and which also includes a unique synchronization word, said apparatus comprising:

a sampling clock having an adjustable phase;

digital sampling means for sampling the received digital stream at the repetition rate of the sampling clock to form a series of digital sample values;

regeneration means for regenerating the character data in response to the digital sample values output by the digital sampling means;

an evaluation unit responsive to the regenerated character data and to transmission path transmission coefficients for determining correction values corresponding to character data pre-oscillation and post-oscillation effects on uncorrected synchronization data derived from the received digital sample values representing the unique word; and

phase synchronization means responsive to said correction values and to said uncorrected synchronization data for correcting said uncorrected synchronization data and using the thus-corrected synchronization data to adjust the phase of said sampling clock.

4,878,230

AMPLITUDE-ADAPTIVE VECTOR QUANTIZATION SYSTEM

Tokumichi Murakami; Masami Nishida, and Atsushi Ito, all of Kamakura, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

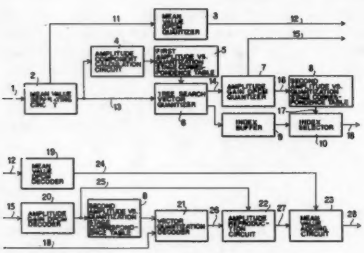
PCT No. PCT/JP87/00793, § 371 Date May 26, 1988, § 102(e) Date May 26, 1988, PCT Pub. No. WO88/02975, PCT Pub. Date Apr. 21, 1988

PCT Filed Oct. 16, 1987, Ser. No. 207,155

Claims priority, application Japan, Oct. 16, 1986, 61-246396; Jan. 20, 1987, 62-10487

Int. Cl.[4] H04B *24/06*

U.S. Cl. 375—27 **4 Claims**



1. An amplitude-adaptive vector quantization system comprising:

a mean value separating circuit which receives K-dimensional vectors derived from a continuous series of input signals divided into blocks of K-samples and separates out a mean value of said input signal vectors;

a predictive differential quantizer which implements DPCM quantization for said separated mean value;

an amplitude component calculation circuit which calculates the magnitude of amplitude components of mean separated input vectors;

a first amplitude vs. quantization stage correspondence table which determines a quantization state of tree-search vector quantization in correspondence to the magnitude of said calculated amplitude components; and

a tree-search vector quantizer which calculates the inner product between each of said mean separated input vectors and normalized output vectors with zero mean arranged to have a tree structure, implements a tree-search for an output vector providing a maximum inner product sequentially up to a last stage, provides a maximum inner product at each stage as an amplitude gain at each stage along with an output vector index, and outputs selectively an amplitude gain of a quantization stage prescribed by said first amplitude vs. quantization stage correspondence table;

an index buffer which holds the output vector index of each quantization stage obtained during the quantization of said tree-search vector quantizer;

an amplitude gain DPCM quantizer which implements DPCM quantization for said output amplitude gain to provide a DPCM-quantized differential amplitude gain and implements DPCM decoding to provide a reproduction of DPCM-quantized amplitude gain;

a second amplitude vs. quantization stage correspondence table which provides a true quantization stage selection signal from said DPCM-decoded reproduction amplitude gain;

a coding section which has an index selector for selecting an output vector to be outputted finally from among output vector indices of all stages held in said index buffer, and transmits or records three elements, including said DPCM-quantized mean value, DPCM-quantized amplitude gain and selected output vector, as a coding output; and

a decoding section including a mean value DPCM decoder and amplitude gain DPCM decoder which implement DPCM decoding for the DPCM quantized mean value and amplitude gain coded by said coding section respectively, an amplitude vs. quantization stage correspondence table which has the same content as said second amplitude vs. quantization stage correspondence table to determine from the DPCM-decoded amplitude gain a quantization output of which stage of coding section is the output vector index decoded by a vector quantization decoder, said vector quantization decoder implementing decoding for said output vector index by switching output vectors adaptively in response to an output of said amplitude vs. quantization stage correspondence table, an amplitude reproducing circuit which implements amplitude reproduction of said decoded normalized output vector on the basis of said DPCM-decoded amplitude gain, and a mean value adding circuit which adds said DPCM-decoded mean value to said amplitude reproduced vector to produce an output signal vector.

4,878,231

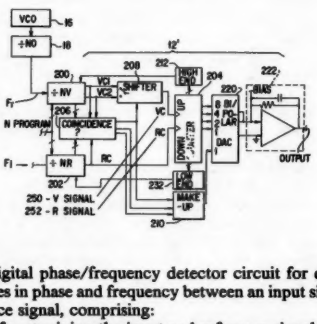
N-PI PHASE/FREQUENCY DETECTOR

Steven P. Cok, Seattle, Wash., assignor to John Fluke Mfg. Co., Inc., Everett, Wash.

Filed Mar. 1, 1988, Ser. No. 162,455

Int. Cl.[4] H04L *27/14*

U.S. Cl. 375—80 **9 Claims**



1. A digital phase/frequency detector circuit for detecting differences in phase and frequency between an input signal and a reference signal, comprising:

means for receiving the input and reference signals;

means for generating different value square wave signals

having a duty ratio corresponding to a phase and frequency difference between said input and reference signals;

means for adding together said square wave signals to provide a resultant square wave signal of unique values as said phase and frequency difference exceeds predetermined particular difference values;

means for integrating said resultant square wave signal to provide a corresponding sawtooth wave signal which extends over plural sawtooth cycles; and

means responsive to said sawtooth wave signal to provide an output signal representative of said phase and frequency difference.

4,878,232

DATA TRANSMISSION SYSTEM

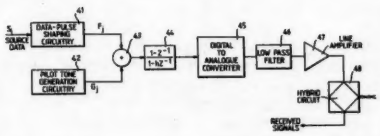
David A. Fisher, Saffron Walden, Great Britain, assignor to STC PLC, London, England

Filed Oct. 15, 1986, Ser. No. 919,036

Claims priority, application United Kingdom, Nov. 20, 1985, 8526610

Int. Cl.[4] H04L *7/04, 5/14*

U.S. Cl. 375—111 **16 Claims**



13. A method for maintaining synchronism between the ends of a digital data transmission system in which data is transmitted over a line between the ends in analogue form, which method includes:

sending a pilot tone additional to the data, the amplitude of the pilot tone being small compared with that of the data signal, the pilot tone having a frequency with a fixed and known relation to the data bit rate, so that adding the pilot tone does not increase bandwidth:

sampling the received data signal under the control of a local clock;

detecting the pilot tone with the sampling of the data signals;

comparing the local clock with the detected pilot tone and adjusting the timing of the local clock in accordance with the results of said comparison to maintain synchronization between the ends of the system;

performing echo cancellation operations upon the received data signal in echo cancellation circuitry including a decision feedback equalizer, the pilot tone being employed in said equalizer;

and, if the value of a pilot tone coefficient in said equalizer exceeds a present value, adjusting the local clock in a step-by-step manner, with the direction of the adjustment being that appropriate to correct a detected discrepancy.

4,878,233

DATA PATTERN SYNCHRONIZER

Mishio Hayashi, Saitama, Japan, assignor to Advantest Corporation, Tokyo, Japan

Filed Dec. 9, 1988, Ser. No. 282,066

Claims priority, application Japan, Dec. 21, 1987, 62-324831

Int. Cl.[4] H04L *7/00*

U.S. Cl. 375—116 **5 Claims**

1. A data pattern synchronizer comprising:

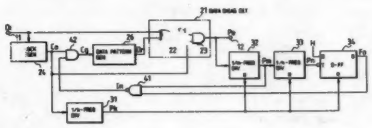
data pattern generating means for generating a reference data pattern in response to a clock synchronized with an input data pattern;

data disagreement detecting means which compares, bit by bit, the input data pattern to be measured for its error rate and the reference data pattern and yields a data disagreement detection pulse when the input data pattern and the reference data pattern are not in agreement with each other;

first frequency dividing means for frequency dividing the clock down to 1/k, k being a positive integer;

second frequency dividing means which is reset by the output pulse of the first frequency dividing means and frequency divides the data disagreement detection pulse down to 1/m, m being a positive integer smaller than k;

third frequency dividing means which is reset by the output pulse by the first frequency dividing means and frequency divides the output pulse of the second frequency dividing



means down to 1/n, n being selected so that it is smaller than k and m·n<k;

flip-flop means which is placed in a first stable state by the output pulse of the third frequency dividing means and in a second stable state by the output pulse of the first frequency dividing means;

first gate means for producing an inhibit pulse based on the output pulse of the second frequency dividing means and the first or second stable state of the flip-flop means; and

second gate means responsive to the inhibit pulse to inhibit the supply of the clock to the data pattern generating means.

4,878,234

DENTAL X-RAY DIAGNOSTICS INSTALLATION FOR PRODUCING PANORAMA SLICE EXPOSURES OF THE JAW OF A PATIENT

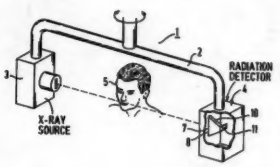
Joachim Pfeiffer; Werner Guenther; Manfred Muether, and Erich Heubeck, all of Bensheim, Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed Jan. 29, 1988, Ser. No. 150,379

Claims priority, application Fed. Rep. of Germany, Feb. 16, 1987, 3704858

Int. Cl.[4] A61B *6/14*

U.S. Cl. 378—40 **16 Claims**



15. A method for operating an x-ray diagnostics installation to produce panorama tomograms of the jaw of a patient corresponding to panorama tomograms obtained by moving x-ray sensitive film behind and past a secondary diaphragm opening, said method comprising the steps of:

irradiating the jaw of said patient with x-radiation;

rotating an x-radiation source and an x-radiation detector, with a secondary diaphragm disposed in front of said detector, around the jaw of said patient such that x-radiation attenuated by said jaw and passing through said secondary diaphragm is incident on said detector;

converting the x-radiation incident on said detector into corresponding light radiation;

directing all of said light radiation onto an image zone of at least one CCD sensor to convert said light radiation into electrical signals, said image zone having a plurality of lines in which charge is generated by said light radiation and having a storage zone, said lines in combination generating a complete charge image corresponding to said x-radiation incident on said detector;

transferring said charge from said lines of said image zone to said storage zone at a first clock frequency selected such that the speed of transfer of charge from said lines to said storage zone simulates said speed of said moving x-ray film; and

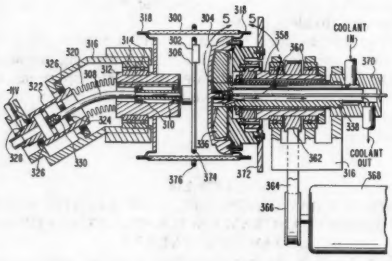
reading out said charge image from said storage zone at a second clock frequency greater than or equal to said first clock frequency.

4,878,235

HIGH INTENSITY X-RAY SOURCE USING BELLOWS

Weston A. Anderson, Palo Alto, Calif., assignor to Varian Associates, Inc., Palo Alto, Calif.

Filed Feb. 25, 1988, Ser. No. 160,223
Int. Cl.[4] H01J *35/04*
U.S. Cl. 378—136 **6 Claims**



1. An X-ray tube comprising:

a frame;

a vacuum chamber rotatably mounted on said frame, a first portion of said vacuum chamber being mounted on said frame for rotation about a first axis fixed with reference to said frame, a second portion of said vacuum chamber being mounted on said frame for rotation about a second axis that intersects said first axis at a single point, said first portion of said vacuum chamber being adapted to transmit rotary motion to said vacuum chamber;

a bellows having a curved centerline, said bellows connecting said first portion to said second portion so that said vacuum chamber is formed;

an anode mounted in said first portion of said vacuum chamber and fixed relative to said chamber;

a rigid member for supporting a cathode, said rigid member having an elongated portion extending into said bellows and having a centerline, the centerline in a first portion of said elongated portion coinciding with said first axis and the centerline in a second portion of said elongated portion coinciding with said second axis;

a first bearing means disposed around said first portion of said elongated portion and concentric with said first axis;

a second bearing means disposed around said second portion of said elongated portion and concentric with said second axis, said first bearing means and said second bearings means permitting the rotation of said vacuum chamber while constraining said rigid member in a fixed position with respect to said frame;

a cathode mounted on said rigid member in said vacuum chamber in opposition to said anode; and

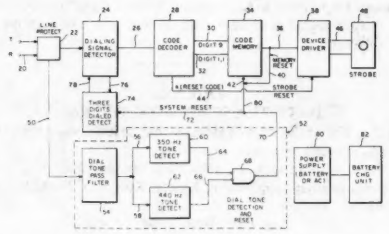
means for heating said cathode.

4,878,236

AUTOMATIC EMERGENCY LOCATOR SYSTEM AND METHOD

Donald K. Ray, 609 4th Ave. East, Conway, S.C. 29526, and Larry G. Taylor, 27 Peachtree Rd., Myrtle Beach, S.C. 29577

Filed Dec. 2, 1988, Ser. No. 278,731
Int. Cl.[4] H04M *11/04*
U.S. Cl. 379—37 **3 Claims**



2. A method of aiding emergency rescue personnel to locate a premises in a remote or difficult to find location which comprises:

(a) detecting the Dial Tone signal of a telephone line;

(b) detecting the dialing of only a predetermined number of the digits of a dialed telephone number and that the digits correspond to an emergency number;

(c) activating in response to this detection a signal means physically located remote from the telephone in a location readily viewed by personnel responding to the dialing of said emergency number;

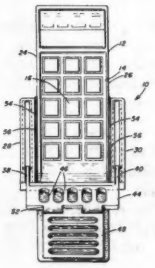
whereby the dialing at the telephone of an emergency number within a premises is automatically detected to activate signal means located externally of the premises without any further action by the person dialing the emergency number so that personnel responding to the dialing of the emergency number may more readily locate the premises from which the emergency number was dialed.

4,878,237

SHOULDER CRADLE FOR SUPPORTING A CELLULAR CAR PHONE

Stephen P. Cianflone, 113 Sharbot Dr., Pittsburgh, Pa. 15237

Filed Nov. 23, 1988, Ser. No. 275,344
Int. Cl.[4] H04Q *7/04*
U.S. Cl. 379—58 **20 Claims**



1. A shoulder cradle for supporting a cellular car phone having a key board on a first surface, an earphone and mouthpiece on a second surface, and third and fourth side surfaces parallel to each other connecting said first and second surfaces comprising:

a first channel secure to said car phone third surface;

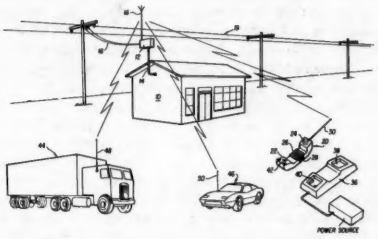
a second channel secured to said car phone fourth surface;
first and second pivoting arms slidable in said first and second channels, respectively, and pivotally secured therein;
a crosspiece secured to said first and second pivoting arms so that said crosspiece and said first and second pivoting arms move as a unit;
a cradle member hingedly secured to said crosspiece;
said first and second channels, said pivoting arms and said crosspiece being positioned so that said car phone keyboard is framed by said pivoting arms and said crosspiece whereby access to said keyboard is not impeded when said shoulder cradle is not in use; and
said pivoting arms being slid and pivoted in said channels to a locked position where said crosspiece and said cradle member cover a substantial portion of said keyboard when said shoulder cradle is in use to support said car phone on the shoulder of a phone user.

4,878,238

CORDLESS TELEPHONE NETWORK

Mark S. Rash, Route 1, Box 481, Goode, Va. 24556; Nicholas D. Harrison, 2915 Creekwood Rd., Norfolk, Va. 23518, and F. Prince Butler, 6127 Beechtree Dr., Alexandria, Va. 22310

Filed Dec. 23, 1987, Ser. No. 137,206
Int. Cl.[4] H04M *11/00*
U.S. Cl. 379—62 **7 Claims**



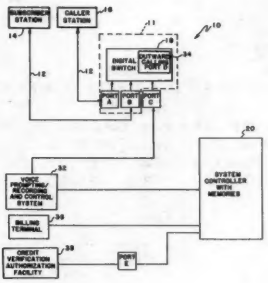
1. A cordless telephone network comprising:
a base unit that is interconnected into a normal telephone network by at least one telephone line for making connection with said telephone line upon receiving a call from said telephone line or upon being requested to do so by a hand-held unit, said base unit including a base unit cordless transmitter/receiver means for cordlessly communicating two-way calls between said at least one telephone line and any one of a plurality of hand-held cordless telephones, said base unit including a temporary memory means therein for receiving a distinctive identifying signal of a hand-held cordless telephone to be communicated with for each call upon initiation of said call by either said telephone line or said hand held unit and storing said distinctive identifying signal in said temporary memory thereof during said call, said base unit and said hand-held cordless telephone communicating with one another using cordless waves having a power range of only around 1,000 feet or less on only cordless telephone channels, said base unit including a monitoring means for monitoring a cordless wave channel on which said hand-held unit is operating during said call, allowing only a hand-held cordless telephone emitting said temporarily memorized identifying signal in combination with a ring signal or hang up signal to respectively communicate said ring or hang up signal to said at least one telephone line, said base unit only emitting ring signals and hang up signals to said hand-held unit during said call in combination with said distinctive identifying signal, said base unit including means for erasing said distinctive identifying signal from said temporary memory upon completion of said call thereby freeing said base unit for communicating ring signals between another one of said plurality of said hand-held cordless telephones and said at least one telephone line.

4,878,239

ANONYMOUS INTERACTIVE TELEPHONE SYSTEM WITH EXPANDED OUTWARD CALLING FEATURES

Merril Solomon, Washington, D.C., and John Kimball, Germantown, Md., assignors to The Telephone Connection, Washington, D.C.

Continuation-in-part of Ser. No. 83,645, Aug. 10, 1987, Pat. No. 4,847,890. This application May 19, 1988, Ser. No. 197,028
The portion of the term of this patent subsequent to Jul. 11, 2006, has been disclaimed.
Int. Cl.[4] H04M *1/64, 1/66*
U.S. Cl. 379—67 **17 Claims**



12. A method of anonymously connecting a caller to a subscriber over public telephone lines, the method comprising the steps of:
providing a published telephone number of a system controller;
storing in said system controller the telephone numbers of a plurality of subscribers;
assigning to each subscriber a subscriber reference number, indexed to the subscriber's telephone number;
publishing an ad for each subscriber that contains a message and the subscriber's reference number;
receiving calls from callers at the system controller through the means of said published telephone number;
receiving a subscriber's reference number from a caller;
recording a message from a caller; and
providing the message to said subscriber.

4,878,240

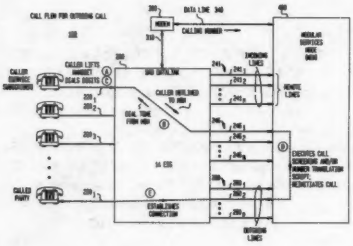
MULTI-SERVICE TELEPHONE SWITCHING SYSTEM

Steve M. Lin, East Brunswick, and Joseph F. Rizzo, Lincroft, both of N.J., assignors to Bell Communications Research, Inc., Livingston, N.J.

Filed Jan. 25, 1988, Ser. No. 148,331
Int. Cl.[4] H04M *3/50*; H04Q *3/42*
U.S. Cl. 379—67 **35 Claims**

35. In a telephone switching system, a method for providing enhanced telephone services to at least one telephone subscriber connected to a telephone switch comprising:
in said telephone switch routing a telephone call involving a subscriber from the telephone switch over a path connecting said telephone switch to a switching system adjunct and generating a message, regarding said routed telephone call, over a datalink connecting said telephone switch to said switching system adjunct; and
in said switching system adjunct and in response to said message executing a pre-defined corresponding service script which is associated with said subscriber and which

defines an enhanced service for that subscriber and taking control of said routed telephone call substantially



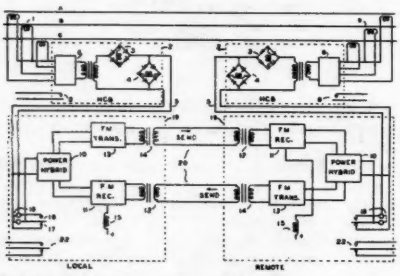
throughout the remainder of its duration so as to provide the enhanced service to said subscriber.

4,878,241

AUDIO FREQUENCY INTERFACE FOR DIFFERENTIAL RELAYS

Everett A. Gilbert, Montrose, Colo., assignor to Da-Tel Research Company, Incorporated, Montrose, Colo.

Filed Oct. 3, 1988, Ser. No. 252,582
Int. Cl.[4] H04M *11/00*
U.S. Cl. 379—106 **3 Claims**



1. A differential relaying system in an electric power network, each end comprising:

a differential relay with current transformers that detects a fault on a three phase 60 Hz power line, converts the fault currents to a single phase 60 Hz voltage output, compares the phase of this voltage to the voltage received from a similar remote relay and closes a contact for the power line phase of a fault between relays;

a power hybrid that converts the single phase output of the differential relay to a sending and a receiving port, the voltage output of the sending port being proportional to the single phase voltage output of the differential relay and the power input to the receiving port being the same as though two differential relays were connected back-to-back;

a linear FM receiver with its output connected to the above receiving port and a linear FM transmitter with its input connected to the hybrids sending port to form separate sending and receiving communication channels;

means to open the connection to the differential relay and short down the output of the hybrid for low levels of FM signal input to the FM receiver;

means to short down the voltage output of the FM receiver when the FM input signal to the receiver is not present or at a lower than desired level;

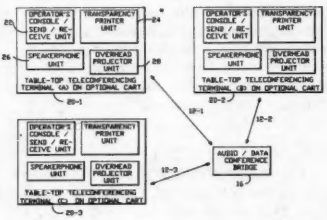
means to short down the voltage output of the FM receiver when noise appears in the received FM signal.

4,878,242

TELECONFERENCING SYSTEM

Robert M. Springer, Wyckoff, N.J.; Richard L. Schmal, Los Gatos, and Eugene H. Gavenman, Los Altos, both of Calif., assignors to Ricoh Corporation, San Jose, Calif.

Continuation-in-part of Ser. No. 890,692, Jul. 25, 1986, abandoned. This application Jul. 22, 1987, Ser. No. 76,380
Int. Cl.[4] H04M *3/56, 11/00*; H04N *1/00*
U.S. Cl. 379—204 **11 Claims**



11. A teleconferencing system comprising

three or more audiographic teleconferencing terminals,

means for establishing and maintaining audio and facsimile image data communications between said teleconferencing terminals wherein said audio and facsimile image data comunications are commonly established and maintained between all of said terminals thrugh a public switched telephone network to an audio conference bridge wherein any one of said terminals can alternately act as a sending terminal or a receiving terminal during a teleconferencing session wherein each of said terminals has a single telephone line connection to said audio bridge and wherein each of said terminals includes means for transmitting said facsimile image data, where any one of said terminals can act as a sending terminal to either transmit audio information simultaneously to each of the remaining of said terminals or transmit facsimile image data simultaneously to each of the remaining of said terminals such that said remaining terminals act as receiving terminals wherein each of said terminals includes means for establishing a dual tone multi-frequency based broadcast and listen protocol when acting as a sending terminal to insure that each of said receiving terminals is connected and enabled for receiving facsimile image data and for establishing parameters for receiving facsimile image data, said sending terminal including

means for generating and transmitting said audio information and facsimile image data to each of said receiving terminals, each of said terminals including

means for printing an image corresponding to said transmitted facsimile image data,

telephone speaker means for generating audible signals corresponding to said transmitted audio information, and

means for acknowledging to said sending terminal receipt of protocol parameters and facsimile image data.

4,878,243

CALL FORWARDING SYSTEM AND METHOD

Kazuo Hashimoto, Tokyo, Japan, assignor to Hashimoto Corporation, Tokyo, Japan

Filed Jul. 27, 1987, Ser. No. 77,928
Claims priority, application Japan, Jul. 25, 1986, 61-174990
Int. Cl.[4] H04M *1/64, 3/54*
U.S. Cl. 379—211 **2 Claims**

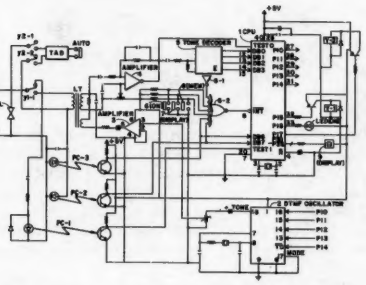
1. A call forwarding control apparatus for use on a subscriber telephone line connected to a central office of a type which causes a call forwarding function (1) to be activated in response to provision of a predetermined first code sequence applied together with a destination telephone number on the

line to the central office, and (2) to be deactivated in response to provision of a predetermined second code sequence on the line to the central office, and wherein the central office provides particular ring back signals in response to an incoming call when call forwarding is activated and otherwise provides usual ring back signals, said apparatus comprising:

memory means storing said predetermined first and second code sequences and having means for storing call forwarding telephone numbers;

means for prestoring in said memory means a first call forwarding telephone number and for registering said first call forwarding telephone number with the central office;

means for receiving an incoming call from a caller and for detecting a hang up of said telephone upon reception by the caller of a first one of said particular ring back signals from the central office indicating that call forwarding is



activated, said hang up by the caller of said telephone cancelling forwarding of said incoming call;

means responsive to said hang up detected by said receiving and detecting means for auto-dialing the caller at the prestored telephone number;

means for storing in the memory means a second call forwarding telephone number sent on the line by the caller; and

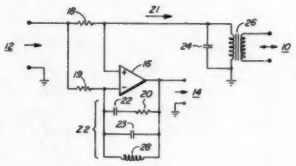
means controllable by the caller for selectively (a) transferring the second call forwarding telephone number together with the predetermined first code sequence to the central office for replacing said first call forwarding telephone number therein by said second call forwarding telephone number, or (b) transferring said predetermined second code sequence to said central office for deactivating said call forwarding function.

4,878,244

ELECTRONIC HYBRID CIRCUIT

Mumtaz B. Gawargy, Nepean, Canada, assignor to Northern Telecom Limited, Montreal, Canada

Filed Sep. 19, 1985, Ser. No. 777,642
Int. Cl.[4] H03B *1/58*
U.S. Cl. 379—402 **15 Claims**



1. An electronic hybrid circuit comprising:

an input port and an output port for connection to a four-wire path;

a differential amplifier having an inverting input, a non-inverting input, and an output coupled to the output port;

first and second impedances each coupled between the input port and a respective one of the inputs of the differential amplifier;

means for coupling a two-wire path to a junction between the first impedance and the differential amplifier; and

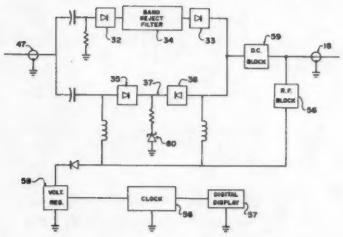
impedance means coupled to a junction between the second impedance and the differential amplifier, the impedance means including an inductive impedance.

4,878,245

CONTROL AND METERING SYSTEM FOR PAY TELEVISION OVER A CABLE NETWORK

Graham C. Bradley, 3200 College Avenue, Regina, Saskatchewan, Canada (S4T 1V9); Alton O. Stretten, 3615 McCallum Avenue, Regina, Saskatchewan, Canada (S4S OS6); John P. Stretten, 14 Susses Crescent, Regina, Saskatchewan, Canada (S4T6A2), and Rex B. Wentzel, #2 Rheims Ct., Lake St., St. Louis, Mo. 63367

Continuation-in-part of Ser. No. 823,759, Jan. 29, 1986, abandoned. This application Jan. 22, 1987, Ser. No. 5,979
Int. Cl.[4] H04N *7/16, 7/10*; H04H *1/00*
U.S. Cl. 380—10 **14 Claims**



13. A secure pay-for-use television distribution system comprising a cable distribution network arranged to distribute subscription television and pay-for-use (PFU) television signals from a central cable station to a plurality of subscriber premises, a plurality of filter units each mounted between the cable network and a subscriber premises to control the transmission of signals to the subscriber premises, a plurality of subscriber actuable control units each for mounting in a respective subscriber premises and connectable to the respective filter unit by a cable and including a power supply means for supplying DC Voltage control signals to the respective filter unit and for receiving therefrom the transmitted signals, each said filter unit comprising inlet terminal means for connection to the cable network, outlet terminal means for connection to said line, means defining a first and a second circuit path between said inlet terminal means and said outlet terminal means, filter means in at least said first circuit path arranged to provide sufficient rejection loss to a TV channel signal so that the TV channel signal emitted from the first circuit path cannot generate a TV picture and arranged to provide a sufficient lower insertion loss to the TV channel signals so as not to interfere with the generation of a TV picture therefrom, and switching circuit means in said first and second circuit paths respective to said control signals from said control unit to open and close alternate ones of said first and second circuit paths, each subscriber control unit including an automatically resettable overcurrent protection device responsive to an increase in current from said power supply means beyond a predetermined maximum current to limit the current supplied from said subscriber control unit to the respective filter unit, said protection device comprising a mono-stable circuit defined by a pair of transistors one of which is normally on and the other of which is normally off, means connecting the filter unit in series with the

normally on transistor, threshold detection means for detecting the voltage across the normally on transistor and for switching on the normally off transistor when the voltage across the normally on transistor exceeds a predetermined maximum, and delay capacitor means for reducing the rate of increase of voltage across the normally on transistor.

4,878,246

METHOD AND APPARATUS FOR GENERATING ENCRYPTION/DECRYPTION KEY

Jose Pastor, Westport, and Maya R. Barton, Ridgefield, both of Conn., assignors to Pitney Bowes Inc., Stamford, Conn.

Filed May 2, 1988, Ser. No. 188,866
Int. Cl.[4] H04L *9/04*
U.S. Cl. 380—44 **19 Claims**

3. Means for generating corresponding keys at first and second stations from an identification number ID, said key having N bits, comprising:

means at each of said first and second stations for generating an identical first plurality of numbers, modulus A and an identical second plurality of numbers, modulus B, from ID, in accordance with a set of algorithms, wherein A and B are prime numbers, and A is greater than N−1;

means at each station for generating identical N values y(x), mod A, from a first polynomial having said first plurality of numbers as coefficients and x as a variable, wherein x is an integer from 0 to N−1;

means at each station for generating an identical value z(y), mod B, from a second polynomial having said second plurality of numbers as coefficients and y as a variable, corresponding to each value of y(x); and,

means at each station for accessing a memory at addresses determined as a function of y,z corresponding to each value of x to retrieve data therein, and reordering said data as a function of the value of x to produce said key.

4,878,247

METHOD FOR THE PHOTOGRAMMETRICAL PICK UP OF AN OBJECT WITH THE AID OF AT LEAST ONE OPTO-ELECTRIC SOLID-STATE SURFACE SENSOR

Wilfried Wester-Ebbinghaus, Barsinghausen; Thomas Luhmann, Hanover; Juergen Mangelsdorf, Cremlingen, and Peter Pini, Brunswick, all of Fed. Rep. of Germany, assignors to Rollei Fototechnic GmbH, Brunswick, Fed. Rep. of Germany

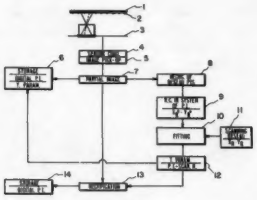
Filed Mar. 18, 1987, Ser. No. 27,530
Claims priority, application European Pat. Off., Mar. 19, 1986, 86103748.9
Int. Cl.[4] G06K *9/00*
U.S. Cl. 382—1 **23 Claims**

1. A method for the photogrammetrical pick up of an object, comprising the steps of:

(a) providing a transparent master having present thereon an image in analog form;

(b) covering the entire image with a reseau having a predetermined point array marked thereon on which divides the reseau into a pattern of discrete, contiguous meshes, defined by a coordinate system;

(c) serially imaging, at least one mesh at a time, the reseau and the image area underlying each mesh to provide a series of partial analog images including the reseau points and analog image portions from each mesh;



(d) opto-electrically converting from analog to digital the analog images of said partial-images to provide corresponding digital partial-images which include the reseau points;

(e) correlating the reseau points in each of said digital partial-images with the predetermined positions of said points in said point array to provide transformation parameters; and

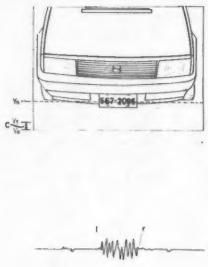
(f) converting the digital partial-images into a total image by applying said transformation parameters.

4,878,248

METHOD AND APPARATUS FOR AUTOMATICALLY RECOGNIZING LICENSE PLATE CHARACTERS

Jia-Ming Shyu; Inn-Ming Chen; Tian-Quey Lee, and Yunn-Chiang Kung, all of Hsin-Chu Hsien, Taiwan, assignors to Industrial Technology Research Institute, Hsin-Chu Hsien, Taiwan

Filed Apr. 20, 1988, Ser. No. 183,987
Int. Cl.[4] G06K *9/00*
U.S. Cl. 382—9 **6 Claims**



1. An apparatus for automatically recognizing the characters on a license plate which is fixed on a vehicle comprising:

sensor/controller means for detecting said vehicle, for determining whether said vehicle has reached a predetermined position, and for releasing a trigger signal when said vehicle has reached said predetermined position, said sensor/controller including first, second, and third pairs of photosensors respectively arranged along two sides of a vehicle driving path;

an image-sampling means for sampling a vehicle image in-

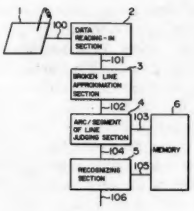
cluding the image of said license plate in response to said trigger signal, and for converting said vehicle image into an electric signal, wherein said sensor/controller activates said image sampling device to indicate that said vehicle has reached a predetermined position when a light path between both said first and second pairs of photosensors is interrupted, said third photosensor pair being arranged to ascertain that said license plate is not shaded by another vehicle, wherein the distance between said first and second photosensor pairs is smaller than the length of said vehicle so that when said vehicle has reached a predetermined position, both of said first and second photosensor pairs detect the presence of said vehicle; and

an image processing means, coupled to said image sampling means for receiving said electric signal, for digitizing said received electric signal, and for processing said digitized electric signal to estimate the position of said license plate, to determine the bounding edges of the characters on said license plate, to separate each character on said license plate, and to recognize each separated character.

4,878,249
PATTERN RECOGNIZING DEVICE

Toshimi Mifune; Yasuo Morooka; Hiroshi Shojima; Junko Mori, and Yasushi Fukunaga, all of Hitachi, Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Sep. 25, 1987, Ser. No. 101,124
Claims priority, application Japan, Sep. 26, 1986, 61-228829
Int. Cl.⁴ G06K *9/00*
U.S. Cl. 382—13 **18 Claims**



1. A pattern recognizing device comprising:

means for forming a structure pattern represented by date of a series of segments, based on a 2-dimensional pattern drawn with a single stroke, wherein said structure pattern forming means includes:

(1) means for detecting segments where the relation between two segments adjacent to each other is ambiguous so that it is not possible to determine whether they form an arc or a segment of line, and

(2) means for forming a plurality of patterns, each of which is comprised of data of a series of segments, both for the case where it is supposed that an ambiguous segment is an arc and for the case where it is supposed that an ambiguous segment is a segment of line, when at least one ambiguous segment is detected by said detecting means;

means for storing a plurality of thesaurus structure patterns defined by data of a series of elements, each of which is at least one of an arc and a segment of line; and

means for selecting one of said thesaurus structure patterns having the greatest similarity with a pattern obtained by said structure pattern forming a means, wherein said means for selecting includes:

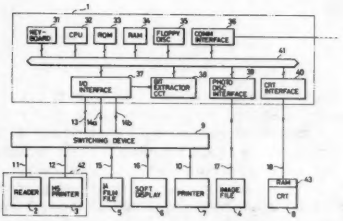
(1) first selecting means for selecting a corresponding most similar one of said thesaurus structure patterns for each of said plurality of patterns obtained by said means for forming a plurality of patterns, and

(2) recognizing means for determining which one of said most similar thesaurus structure patterns and corresponding one of said plurality of patterns have the greatest similarity.

4,878,250
IMAGE PROCESSING SYSTEM

Masahide Kotera; Motofumi Konishi, both of Yokohama; Yoshio Ando, Chigasaki; Toshio Iwaya, Shiki; Kanou Tanaka, Yokohama; Norio Hashimoto, Tokyo; Yasutoshi Sugita, Urayasu; Yoshitaka Sano, Matsudo, and Satoshi Ono, Yokohama, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 48,507, May 11, 1987, abandoned, which is a continuation of Ser. No. 658,380, Oct. 5, 1984, abandoned. This application Mar. 10, 1988, Ser. No. 169,134
Claims priority, application Japan, Oct. 12, 1983, 58-191338; Oct. 12, 1983, 58-191339
Int. Cl.⁴ G06K *9/36*
U.S. Cl. 382—56 **9 Claims**



1. An image processing system comprising:

a bus for transmitting image data;

means for generating a first form of image data representing a frame of an original image;

first and second processing means, connected to said bus, for receiving and processing image data transmitted on said bus, said first processing means adapted to process said first form of the image data, and said second processing means being adapted to process a second form of the image data, said second form being different from said first form;

converting means, connected to said generating means, for converting said first form of image data generated by said generating means into the second form of image data representing a frame of the original image;

storage means, connected to said converting means, for storing said second form of image data output from said converting means; and

transmitting means, connected to said bus, said generating means and said storage means, for intermittently transmitting a frame of said first form of image data generated by said generating means on a basis of a predetermined amount through said bus to said first processing means, while transmitting said second form of image data stored in said storage means through said bus to said second processing means in blank intervals which occur between the intermittent transmissions of a frame of said first form of image data.

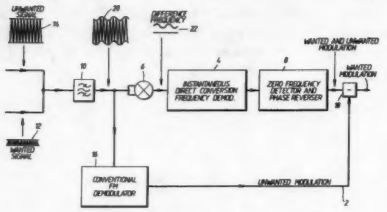
4,878,251
INTERFERENCE SIGNAL SUPPRESSOR FOR A RADIO RECEIVER

Christopher K. Richardson, Romsey, England, assignor to Plessey Overseas Limited, Ilford, England

Filed Apr. 25, 1986, Ser. No. 856,327
Claims priority, application United Kingdom, Apr. 29, 1985, 8510820
Int. Cl.⁴ H04B *1/16*
U.S. Cl. 455—206 **14 Claims**

1. An interference suppressor and demodulation unit for a

radio receiver for suppressing an unwanted FM signal having a signal strength greater than the signal strength of a wanted FM signal, each FM signal having a respective frequency, the suppressor comprising means for providing an amplitude modulated beat signal from the wanted and unwanted FM signals, said means being coupled to a means for providing a difference frequency signal in dependence upon the amplitude modulated beat signal, a first demodulator arranged to receive the difference frequency signal and apply this through a zero frequency detector and phase reverser to provide a composite baseband



signal comprising a modulation of the wanted and unwanted FM signals, a further demodulator arranged to receive the amplitude modulated beat signal, for providing a baseband signal corresponding to the modulation of the unwanted FM signal, and a combiner coupled to the first demodulator and said further demodulator, the combiner being arranged to receive the composite baseband signal and the baseband signal for providing an output signal comprising the modulation of the wanted FM signal and in which the unwanted signal has been suppressed.

4,878,252

MODIFIED MULTI-PATH DETECTOR

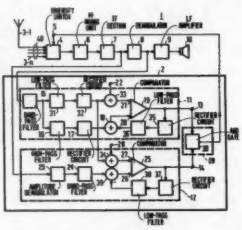
Franciscus J. A. M. Sessink, Eindhoven, Netherlands, assignor to U. S. Philips Corporation, New York, N.Y.

Filed Nov. 30, 1987, Ser. No. 126,382

Claims priority, application Netherlands, Dec. 18, 1986, 8603221

Int. Cl.[4] H04B *1/10*

U.S. Cl. 455—276 **5 Claims**



1. A receiver for angle-modulated signals, coming from one or a plurality of antennas, comprising a diversity switch having a signal input connected to at least one antenna, a signal output and a control input for selecting at the signal output an angle-modulated signal by means of a control signal on the control input, and comprising a multi-path detector coupled to the signal output and connected to the control input for supplying the control signal to the control input when the multi-path detector detects multi-path distortion in the selected signal, the multi-path detector comprising a threshold arrangement coupled to the output of the diversity switch for generating a threshold voltage having an amplitude value depending on the frequency swing of the angle-modulated signal, characterized in that the threshold voltage has an amplitude value instantaneously varying with the frequency swing of the angle-modulated signal, and in that said multi-path detector has a sensitivity the variation of which instantaneously corresponds to the variation of the amplitude value of the threshold voltage.

4,878,253

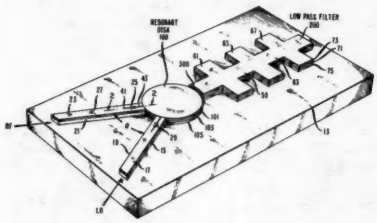
PLANAR MONOLITHIC MILLIMETER WAVE MIXER

Samuel Dixon, Jr., Neptune, N.J., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Mar. 31, 1988, Ser. No. 176,125

Int. Cl.[4] H04B *1/26*

U.S. Cl. 455—327 **1 Claim**



1. A monolithic waveguide mixer device comprising:

a pair of arms connected respectively to a source of incident RF power and a local oscillator; said arms containing a layer of semi-insulating gallium arsenide deposited upon a metallic ground plane and covered with a conductive layer; said arms having in-situ Schottky barrier diodes monolithically integrated in the arms such that said diodes are oriented in opposite directions respective to one another; and a resonant disk abutting said arms and composed of a layer of semi-insulating gallium arsenide sandwiched between two gold layers; said arms separated by angle theta (θ) such that theta (θ) should be no smaller than one-quarter the guide wavelength; and said resonant disk gap-coupled to a low-pass filter.

4,878,254

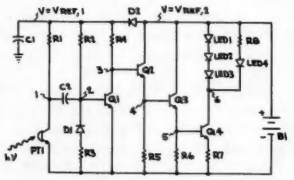
COMPACT SIGNAL ENHANCER

David Richardson, 2588 Knightsbridge La., Santa Clara, Calif. 95050

Filed Dec. 30, 1986, Ser. No. 947,853

Int. Cl.[4] H04B *9/00*

U.S. Cl. 455—601 **12 Claims**



1. An electronic network for receipt, enhancement and re-broadcast of an electromagnetic signal, the network comprising:

a source of ground reference voltage;

a first source of positive voltage;

a second source of positive voltage;

a first capacitor of capacitance substantially 47 microfarads, with a first capacitor terminal connected to ground and second capacitor terminal connected to the first source of positive voltage;

a first resistor of resistance substantially 150 Ohms with a first resistor terminal connected to the first positive voltage source;

photosensitive means having a collector connected to a second terminal of the first resistor and having an emitter connected to the ground reference voltage;

a second capacitor of capacitance substantially 1–10 nanofarads, with a first capacitor terminal connected to the collector of the photosensitive means;

a second resistor of resistance substantially 3 megaohms, with a first resistor terminal connected to the first positive voltage source and with a second resistor terminal connected to a second terminal of the second capacitor;

a first diode with one terminal connected to the second terminal of the second capacitor;

a third resistor of resistance substantially 36 kilo-ohms, with a first resistor terminal connected to the anode of the first diode and with a second resistor terminal connected to the ground reference voltage;

a fourth resistor of resistance substantially 820 kilo-ohms, with a first resistor terminal connected to the first positive voltage source;

a first transistor with its collector connected to a second terminal of the fourth resistor, its base connected to the second terminal of the second capacitor, and its emitter connected to the ground reference voltage;

a second diode with its cathode connected to the first positive voltage source and its anode connected to the second positive voltage source;

a second transistor with its base operatively associated with the collector of the first-transistor; a fifth resistor of resistance substantially one Ohm, with a first resistor terminal connected to the emitter of the second transistor, and with the second resistor terminal connection to the ground reference voltage;

a light emitting diode with its anode connected to the second positive voltage source and its cathode operatively associated with the collector of the second transistor; and

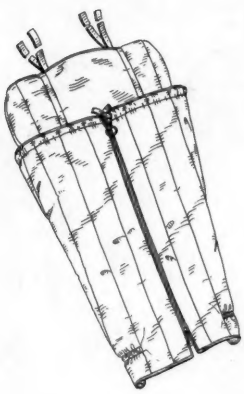
a battery or other voltage source, providing voltage of substantially four volts or more, with its high voltage terminal connected to the second positive voltage source and its low voltage terminal connected to the ground reference voltage.

DESIGNS

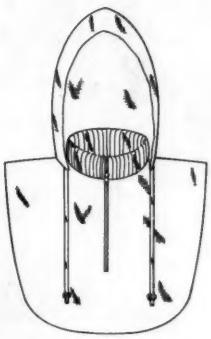
OCTOBER 31, 1989

304,255
BRASSIERE
Shiela Guss, Saddle Brook, N.J., assignor to Playtex Apparel, Inc., Stamford, Conn.
Filed Jul. 23, 1986, Ser. No. 889,580
Term of patent 14 years
U.S. Cl. D2—24

304,256
BUNTING BAG
Theresa D. McEntee, 116 Roselawn Ave., Toronto, Ontario, Canada (M4R 1E7)
Filed Nov. 17, 1986, Ser. No. 931,192
Claims priority, application Canada, Jun. 23, 1986, 23-06-86-1
Term of patent 14 years
U.S. Cl. D2—25

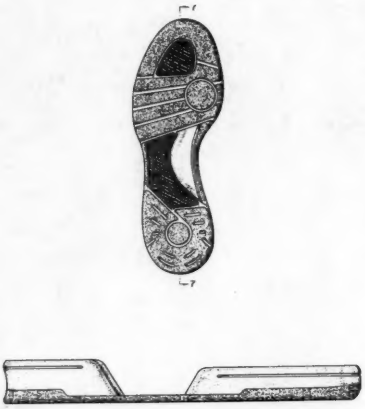


304,257
DICKEY AND HOOD COMBINATION
Larry R. Dorning, 104 W. Washington St., Paris, Tenn. 38242
Filed Jun. 2, 1986, Ser. No. 869,922
Term of patent 14 years
U.S. Cl. D2—181



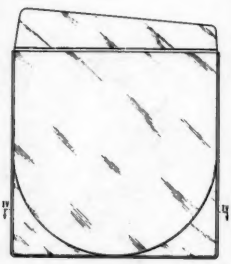
304,258
FOOTBALL JERSEY
Hal D. Mitchell, Rolla, Mo., and James D. Gardner, Knoxville, Tenn., assignors to Figgie International Inc., Willoughby, Ohio
Filed Jan. 23, 1987, Ser. No. 6,595
Term of patent 14 years
U.S. Cl. D2—217

304,259
SHOE SOLE
Kiyotaka Nakano, Kurume, Japan, assignor to Nippon Rubber Co., Ltd., Tokyo, Japan
Filed Feb. 10, 1987, Ser. No. 13,265
Claims priority, application Japan, Sep. 5, 1986, 61-35300
Term of patent 14 years
U.S. Cl. D2—320



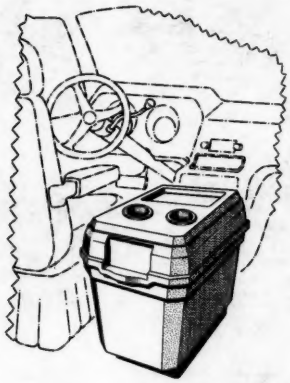
304,260
TELESCOPIC UMBRELLA STICK FOR COLLAPSIBLE UMBRELLAS
Tilmann Schultes, and Joachim Seidel, both of Solingen, Fed. Rep. of Germany, assignors to Kortenbach Verwaltungs-und Beteiligungsgesellschaft mbH & Co., Solingen, Fed. Rep. of Germany
Filed Feb. 3, 1986, Ser. No. 825,438
Term of patent 14 years
U.S. Cl. D3—10

304,261
RECORD HOLDER
George C. H. Cheung, Hong Kong, Hong Kong, assignor to Tak Ming Industrial Co., Kowloon, Hong Kong
Filed May 22, 1986, Ser. No. 866,110
Claims priority, application United Kingdom, Nov. 22, 1985, 1030642
Term of patent 14 years
U.S. Cl. D3—35



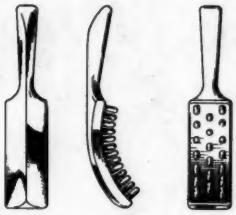
304,262
TOILETRY KIT
David W. Mays, 3018 Kingsley Rd., Shaker Heights, Ohio 44122
Filed Jul. 17, 1986, Ser. No. 886,448
Term of patent 14 years
U.S. Cl. D3—39

304,263
COMBINED AUTOMOTIVE CONSOLE AND LITTER CONTAINER
Donald R. Mull, 823 Holloway St., Alcoa, Tenn. 37701
Continuation-in-part of Ser. No. 659,082, Dec. 14, 1984. This application May 12, 1986, Ser. No. 862,575
Term of patent 14 years
U.S. Cl. D3—40

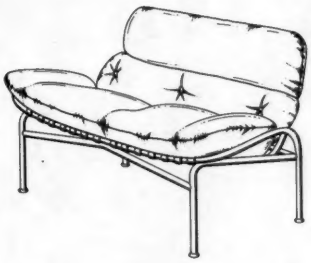


304,264
CARRYING CASE
Paul K. Peregrine, 1541 Platte St., Denver, Colo. 80202, and Scott A. Seamans, 660 Quince Cir., Boulder, Colo. 80302
Division of Ser. No. 840,725, Feb. 28, 1986. This application Feb. 13, 1989, Ser. No. 309,229
Term of patent 14 years
U.S. Cl. D3—50

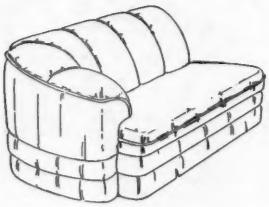
304,265
HAIRBRUSH
Michael Boweter, Corvallis, Oreg., assignor to NUWAVE Products Ltd, Santa Barbara, Calif.
Filed May 22, 1987, Ser. No. 52,956
Term of patent 14 years
U.S. Cl. D4—136



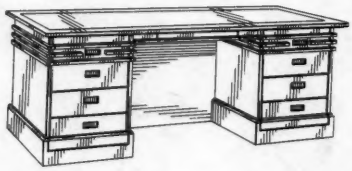
304,266
SOFA
Richard Frinier, Long Beach, Calif., assignor to Brown Jordan Company, El Monte, Calif.
Filed Jul. 3, 1985, Ser. No. 752,240
The portion of the term of this patent subsequent to Jul. 5, 2002, has been disclaimed.
Term of patent 14 years
U.S. Cl. D6—381

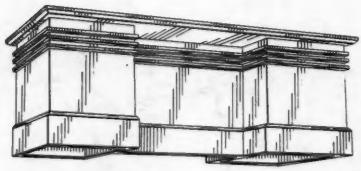


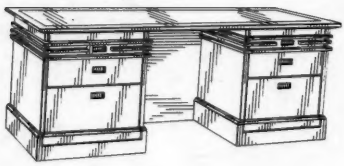
304,267
SOFA
Frank A. Warren, Denville, N.J., assignor to Universal Furniture Industries, Inc., High Point, N.C.
Filed Nov. 12, 1986, Ser. No. 929,659
Term of patent 14 years
U.S. Cl. D6—381

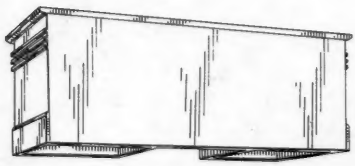


304,268
DESK
Inger Bartlett, 57 Chestnut Park Road, Toronto, Ontario, Canada (M4W 1W7)
Filed Oct. 21, 1985, Ser. No. 789,697
Claims priority, application Canada, Aug. 2, 1985, 02-08-85-8
Term of patent 14 years
U.S. Cl. D6—428

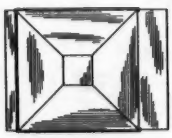






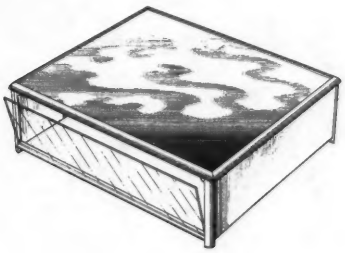


304,269
PROTECTIVE HOLDER FOR A BEVERAGE
Scott W. Sandgren, 8817 W. River Rd., Brooklyn Park, Minn. 55444
Filed Jun. 9, 1986, Ser. No. 872,454
Term of patent 14 years
U.S. Cl. D6—432



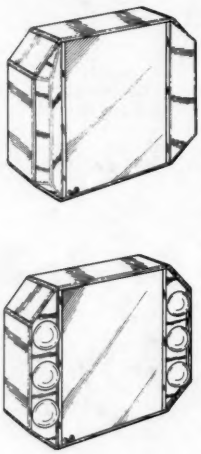
304,270
ADJUSTABLE KEYBOARD SUPPORT STAND
Howard B. Goldman, 246 Ashford Ave., Tonawanda, N.Y. 14150
Filed Nov. 17, 1986, Ser. No. 931,151
Term of patent 14 years
U.S. Cl. D6—462

304,271
AUDIO VIDEO COMPONENT DUST COVER
Van K. Johnson, 7005 Meadow Park North, North Richland Hills, Tex. 76180
Filed Nov. 19, 1986, Ser. No. 932,902
Term of patent 14 years
U.S. Cl. D6—470

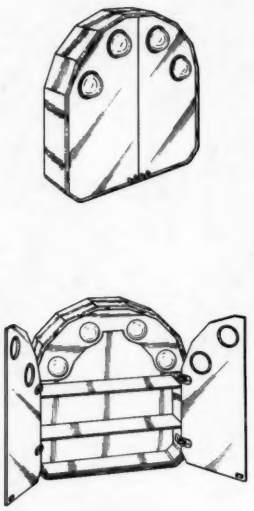


304,272
WALL MOUNTED PLANTER
Ada M. Brown, 3240 Prospect, Flint, Mich. 48504
Filed Nov. 30, 1987, Ser. No. 126,682
Term of patent 14 years
U.S. Cl. D6—557

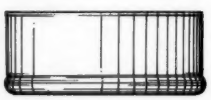
304,273
MIRRORED CABINET
Heinz G. Baus, 35 Wartbodenstrasse, CH-3626 Hünibach-Thun, Switzerland
Filed Aug. 17, 1987, Ser. No. 85,657
Term of patent 14 years
U.S. Cl. D6—559



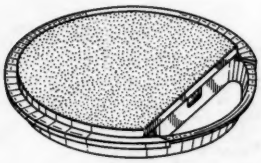
304,274
COMBINED MIRRORED CABINET AND LIGHTS
Heinz G. Baus, 35 Wartbodenstrasse, CH-3626 Hünibach-Thun, Switzerland
Filed Aug. 17, 1987, Ser. No. 85,693
Claims priority, application World Int. Prop. O., Mar. 16, 1987, DM/008330
Term of patent 14 years
U.S. Cl. D6—561



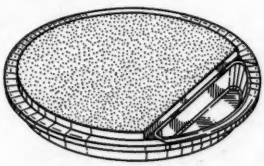
304,275
BOWL
Val A. Kiefer, 11333 20th Ave. NE, Seattle, Wash. 98125
Filed Dec. 29, 1986, Ser. No. 947,497
Term of patent 14 years
U.S. Cl. D7—23

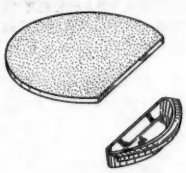


304,276
CUTTING BOARD OR THE LIKE
Martin J. Wolff, North Providence, and Larry G. Zimmerman, North Smithfield, both of R.I., assignors to Dart Industries Inc., Deerfield, Ill.
Filed Jul. 17, 1986, Ser. No. 887,843
Term of patent 14 years
U.S. Cl. D7—46

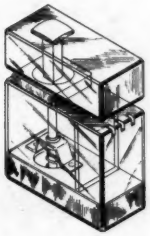


304,277
COMBINED FOOD CUTTING BOARD AND MEASURING CUP OR THE LIKE
Martin J. Wolff, North Providence, and Larry G. Zimmerman, North Smithfield, both of R.I., assignors to Dart Industries Inc., Deerfield, Ill.
Filed Jul. 23, 1986, Ser. No. 889,482
Term of patent 14 years
U.S. Cl. D7—46

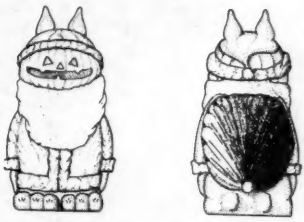




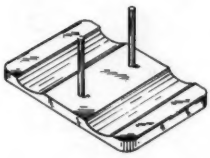
304,278
CONDIMENT MILL
William E. Bounds, P.O. Box 1547, Torrance, Calif. 90505
Filed Jun. 17, 1986, Ser. No. 875,657
Term of patent 14 years
U.S. Cl. D7—53



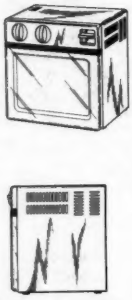
304,279
CONDIMENT SHAKER
J. Craig Colquitt, 9331 Barrington Blvd., Knoxville, Tenn. 37922
Filed Nov. 21, 1986, Ser. No. 933,595
Term of patent 14 years
U.S. Cl. D7—56



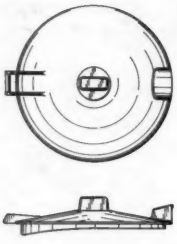
304,280
COMBINED POT LID AND UTENSIL HOLDER
Mark A. Leighton, 2200 Fifth Ave., Helena, Mont. 59601
Filed Feb. 20, 1987, Ser. No. 16,860
Term of patent 14 years
U.S. Cl. D7—73



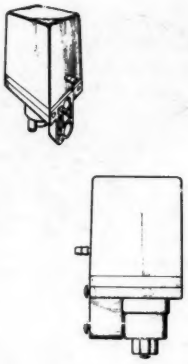
304,281
MICROWAVE OVEN
Masahito Naito, Kokubunji; Toshiro Higa, Hino; Tetsuro Aobori, Kunitachi; Eiichi Kubota, Tokyo, and Takeichi Obata, Hino, all of Japan, assignors to Hitachi Heating Appliances Co., Ltd., Kashiwa, Japan
Filed Jun. 20, 1986, Ser. No. 876,393
Claims priority, application Japan, Dec. 26, 1985, 60-54316
Term of patent 14 years
U.S. Cl. D7—351



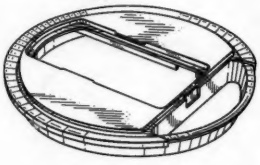
304,282
CONTAINER LID
Bryan A. Feimer, Parma; Henry G. Roethel, Ravenna, and Raymond P. Kowalics, Solon, all of Ohio, assignors to The Meyer Company, Cleveland, Ohio
Filed May 2, 1986, Ser. No. 859,242
Term of patent 14 years
U.S. Cl. D7—391



304,283
SYRUP PUMP FOR BEVERAGE DISPENSING
William S. Credle, Jr., Stone Mountain, Ga., assignor to The Coca-Cola Company, Atlanta, Ga.
Filed May 2, 1986, Ser. No. 859,878
Term of patent 14 years
U.S. Cl. D7—397

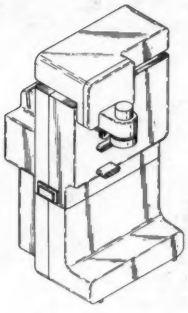


304,284
FOOD GRATER FRAME OR THE LIKE
Martin J. Wolff, North Providence, and Larry G. Zimmerman, North Smithfield, both of R.I., assignors to Dart Industries Inc., Deerfield, Ill.
Filed Jul. 17, 1986, Ser. No. 887,410
Term of patent 14 years
U.S. Cl. D7—412

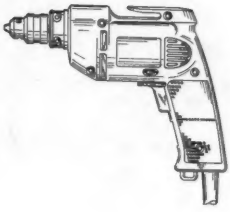


304,285
DIVOT REPLACER FOR GOLF COURSE MAINTENANCE
John E. Schreiber, 19 York Rd., Glenmont, N.Y. 12077
Filed Oct. 29, 1987, Ser. No. 114,372
Term of patent 14 years
U.S. Cl. D8—1

304,286
ELECTRIC CAN OPENER WITH VERTICAL HEIGHT ADJUSTMENT
George Schmidt, Dougleston, N.Y., assignor to Farberware Inc., Bronx, N.Y.
Filed Apr. 4, 1986, Ser. No. 850,369
Term of patent 14 years
U.S. Cl. D8—36

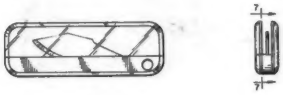


304,287
ELECTRIC DRILL OR SIMILAR ARTICLE
Donald W. Zurwelle, Lutherville, Md., assignor to Black & Decker Inc., Newark, Del.
Filed Aug. 7, 1987, Ser. No. 83,412
Term of patent 14 years
U.S. Cl. D8—68

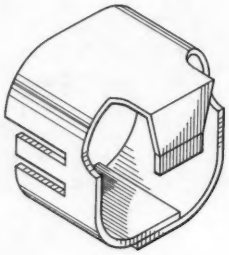


304,288
KNIFE SHARPENER
Raymond A. Young, 2615 SE. Courtney Sp. 8, Milwaukie, Oreg. 97222
Continuation-in-part of Ser. No. 107,530, Oct. 13, 1987. This application Nov. 30, 1987, Ser. No. 126,681
Term of patent 14 years
U.S. Cl. D8—93

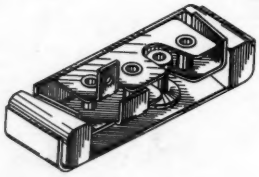
304,289
LETTER OPENER
Chester E. Kirk, 3537 NW. Mink Pl., Corvallis, Oreg. 97330
Filed Apr. 3, 1986, Ser. No. 847,827
Term of patent 14 years
U.S. Cl. D8—102



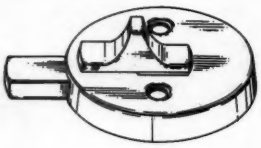
304,290
AUTOMOBILE STEERING COLUMN LOCK
James E. Wright, 1244 Elson Rd., Chester Township, Delaware County, Pa. 19015
Filed May 18, 1988, Ser. No. 195,531
Term of patent 14 years
U.S. Cl. D8—330



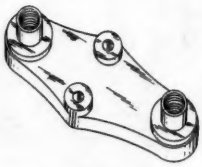
304,291
COMBINED LATCH HOUSING AND INTERENGAGEABLE STRIKE PLATE
Lee S. Weinerman, Medina, and Joel T. Vargus, Middleburg Heights, both of Ohio, assignors to The Eastern Company, Cleveland, Ohio
Filed Oct. 16, 1987, Ser. No. 109,421
Term of patent 14 years
U.S. Cl. D8—331



304,292
SURFACE MOUNTED LATCH BOLT
Louis G. Bobrowski, Berlin, Conn., assignor to The Stanley Works, New Britain, Conn.
Filed Dec. 9, 1987, Ser. No. 130,662
Term of patent 14 years
U.S. Cl. D8—341

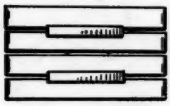


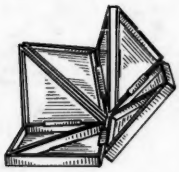
304,293
SOLDERABLE MOUNT FOR AN ELECTRONIC DEVICE
Alfred F. McCarthy, Belmount, N.H., assignor to Aavid Engineering, Inc., Laconia, N.H.
Filed May 30, 1986, Ser. No. 869,072
Term of patent 14 years
U.S. Cl. D8—349



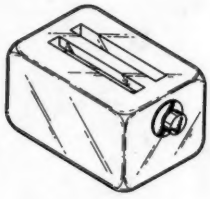
304,294
COMBINED CONTAINER AND INTEGRAL FLEXIBLE FUNNEL
Dale Grenda, 1110 Marshall Ave., South Milw., Wis. 53172
Filed Apr. 18, 1986, Ser. No. 856,125
Term of patent 14 years
U.S. Cl. D9—337

304,295
FOLDING CONTAINER
Kichinosuke Yamanaka, Tokyo, Japan, assignor to Kabushiki Kaisha Bandai d/b/a Bandai Co., Ltd., Tokyo, Japan
Filed Jul. 2, 1987, Ser. No. 69,595
Claims priority, application Japan, Jan. 29, 1987, 62-3305
Term of patent 14 years
U.S. Cl. D9—341

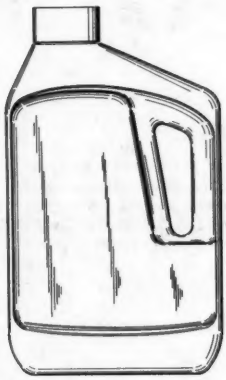




304,296
COMBINED BOTTLE AND HANDLE
Robert Wilson, 1344 Carver Pl., Hamilton, Ohio 45011, and Wayne Hayes, 95 Walnut Pl., Springboro, Ohio 45066
Filed Jul. 29, 1986, Ser. No. 890,352
Term of patent 14 years
U.S. Cl. D9—374



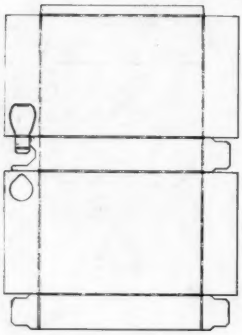
304,297
BOTTLE
Umberto D. I. Segati, Brussels, Belgium, assignor to Colgate-Palmolive Company, Piscataway, N.J.
Filed Mar. 31, 1988, Ser. No. 176,812
The portion of the term of this patent subsequent to Aug. 22, 2003, has been disclaimed.
Term of patent 14 years
U.S. Cl. D9—376



304,298
COMBINED BOTTLE AND CAP
Roger Bannister, London, England, assignor to Helix Fragrances Inc., Toronto, Canada
Filed Aug. 1, 1986, Ser. No. 891,670
Claims priority, application Canada, May 14, 1986, 14-05-86-11
Term of patent 14 years
U.S. Cl. D9—386

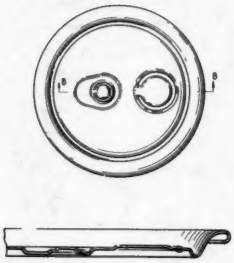
304,299
PUNCTURABLE TRANSPARENT CONTAINER
Mitsunori Sakamoto, 9-28-8-323, Seijo, Setagaya-Ku, Tokyo 157, Japan
Filed Apr. 14, 1986, Ser. No. 851,687
Term of patent 14 years
U.S. Cl. D9—425

304,300
CONTAINER BLANK
Richard T. Duke, Cincinnati, Ohio, assignor to The Procter & Gamble Company, Cincinnati, Ohio
Filed Feb. 6, 1986, Ser. No. 826,702
Term of patent 14 years
U.S. Cl. D9—433

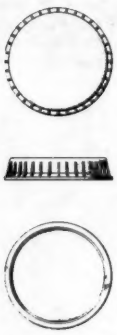


304,301
MEASURING CUP CLOSURE
Gates M. Moss, and Samuel Ross, both of Cincinnati, assignors to The Procter & Gamble Company, Cincinnati, Ohio
Filed Feb. 26, 1986, Ser. No. 836,616
Term of patent 14 years
U.S. Cl. D9—436

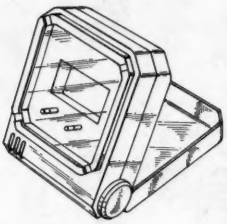
304,302
CAN END
Alan G. Dalli, Warrandyte, and Peter L. Revill, Middle Park, both of Australia, assignors to The Broken Hill Proprietary Company Limited, Victoria, Australia
Filed Dec. 4, 1985, Ser. No. 804,639
Claims priority, application Australia, Jun. 5, 1985, 1531/85; Jul. 17, 1985, 1909/85
Term of patent 14 years
U.S. Cl. D9—438



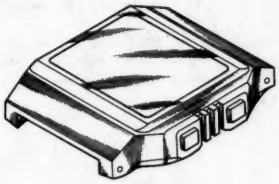
304,303
CONTAINER CAP
Charles W. Hurst, and Gates M. Moss, both of Cincinnati, Ohio, assignors to The Procter & Gamble Company, Cincinnati, Ohio
Filed Feb. 6, 1986, Ser. No. 826,703
Term of patent 14 years
U.S. Cl. D9—453



304,304
FLIP UP MODULAR DIGITAL CLOCK FOR AUTOMOBILE CONTROL PANELS
Pierre Charet, and Duke Krasi, both of Miami, Fla., assignors to Rally Manufacturing, Inc., Miami, Fla.
Filed May 7, 1986, Ser. No. 860,778
Term of patent 14 years
U.S. Cl. D10—15

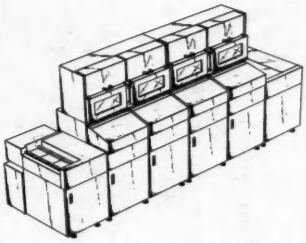


304,305
WRIST WATCH
Takashi Morishima, Fussa, Japan, assignor to Casio Computer Co., Ltd., Tokyo, Japan
Filed Nov. 24, 1986, Ser. No. 934,322
Term of patent 14 years
U.S. Cl. D10—38

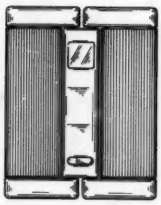


304,306
COMPUTERIZED MULTIPLE FUNCTION BICYCLE METER
Joe Kagayama, Osaka, Japan, assignor to Cat Eye Co., Ltd., Osaka, Japan
Filed Dec. 31, 1986, Ser. No. 948,292
Claims priority, application Japan, Sep. 2, 1986, 61-034694
Term of patent 14 years
U.S. Cl. D10—46

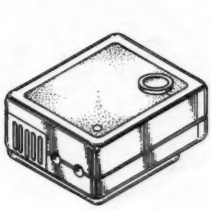
304,307
AUTOMATIC CHEMICAL ANALYZER
Yawara Nagai, Hachioji; Shigeru Yoshinari, Tokyo, and Masao Ushikubo, Hachioji, all of Japan, assignors to Olympus Optical Co., Ltd., Japan
Filed Apr. 16, 1986, Ser. No. 852,917
Term of patent 14 years
U.S. Cl. D10—81



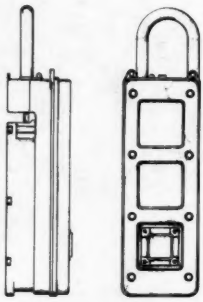
304,308
WEIGHING SCALES
Shinichi Morooka, Osaka, Japan, assignor to Sharp Kabushiki Kaisha, Osaka, Japan
Filed Oct. 14, 1986, Ser. No. 918,811
Claims priority, application Japan, Apr. 14, 1986, 61-13891
Term of patent 14 years
U.S. Cl. D10—92



304,309
TRANSMITTER CASE
Dennis L. Vories, Valley Center, Calif., assignor to F. B. Nutter Enterprises, Inc., San Bernardino, Calif.
Filed Mar. 25, 1986, Ser. No. 845,828
Term of patent 14 years
U.S. Cl. D10—106



304,310
EMERGENCY RADIO SIGNAL TRANSMITTER
René Calis, Pantin, France, assignor to Aerospatiale Societe Nationale Industrielle, Paris, France
Filed Oct. 9, 1986, Ser. No. 917,375
Claims priority, application Int'l Pat. Institute, Apr. 21, 1986, DM/006 816
Term of patent 14 years
U.S. Cl. D10—106



304,311
POP-UP TIMING DEVICE
DuWayne C. Radke, Woodbury, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.
Filed Jun. 6, 1986, Ser. No. 871,597
Term of patent 14 years
U.S. Cl. D10—109

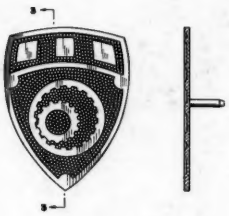
304,312
NECKLACE
Paolo Bulgari, Rome, Italy, assignor to Partecipazioni Bulgari S.p.A., Rome, Italy
Filed Apr. 30, 1987, Ser. No. 44,122
Claims priority, application Italy, Oct. 31, 1986, 36214/86[U]
Term of patent 14 years
U.S. Cl. D11—13

304,313
BROOCH
Elaine Foster, 35 E. Ninth St., Apt. 33, New York, N.Y. 10003
Filed Aug. 28, 1986, Ser. No. 901,479
Term of patent 14 years
U.S. Cl. D11—48

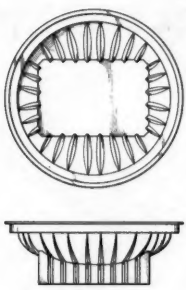
304,314
LINK ELEMENT
Paolo Bulgari, Rome, Italy, assignor to Partecipazioni Bulgari S.p.A., Rome, Italy
Filed Apr. 30, 1987, Ser. No. 44,109
Claims priority, application Italy, Oct. 31, 1986, 36207-B/86
Term of patent 14 years
U.S. Cl. D11—93

304,315
LINK ELEMENT
Paolo Bulgari, Rome, Italy, assignor to Partecipazioni Bulgari S.p.A., Rome, Italy
Filed Apr. 30, 1987, Ser. No. 44,128
Claims priority, application Italy, Oct. 31, 1986, 36199-B/86
Term of patent 14 years
U.S. Cl. D11—93

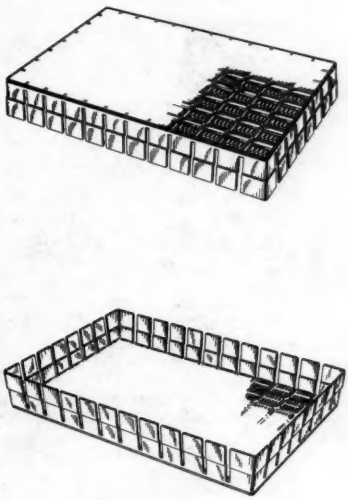
304,316
BADGE OR THE LIKE
Ralph Perricelli, 313 Oradell Ave., Paramus, N.J. 07652, and Raymond Gonzalez, 169 Jane St., Englewood, N.J. 07631
Filed Oct. 9, 1987, Ser. No. 106,708
Term of patent 14 years
U.S. Cl. D11—99



304,317
FLORAL CONTAINER
Curtis D. Wagner, Houston, Tex., assignor to Ivex of Delaware, Inc., Houston, Tex.
Filed Mar. 23, 1987, Ser. No. 29,490
Term of patent 14 years
U.S. Cl. D11—153



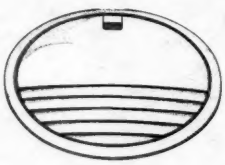
304,318
PLANT BOX
Leo Tervo, Suonenjoki; Matti Jouppi, and Ville Paasonen, both of Jyvaskyla, all of Finland, assignors to Vapo Oy, Finland
Filed Mar. 4, 1987, Ser. No. 21,442
Claims priority, application Finland, Sep. 4, 1986, 864/86
Term of patent 14 years
U.S. Cl. D11—155



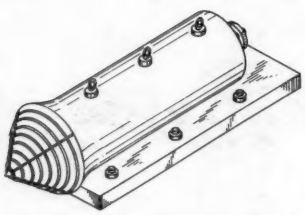
304,319
RECUMBANT BICYCLE
Tim Brummer, 1308 W. Willow Ave., Lompoc, Calif. 93436
Filed Dec. 5, 1983, Ser. No. 557,949
Term of patent 14 years
U.S. Cl. D12—111

304,320
TIRE
Mark L. Bonko, Hartville, Ohio, assignor to The Goodyear Tire & Rubber Company, Akron, Ohio
Filed Jan. 30, 1987, Ser. No. 9,400
Term of patent 14 years
U.S. Cl. D12—151

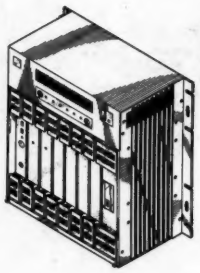
304,321
FRONT FACE OF A VEHICLE HUB CAP
Wolfgang Benke, Offenbach, Fed. Rep. of Germany, assignor to Westfälische Metall Industrie KG Huec & Co., Lippstadt, Fed. Rep. of Germany
Filed Mar. 31, 1986, Ser. No. 846,283
Claims priority, application Fed. Rep. of Germany, Sep. 30, 1985, MR 539
Term of patent 14 years
U.S. Cl. D12—204



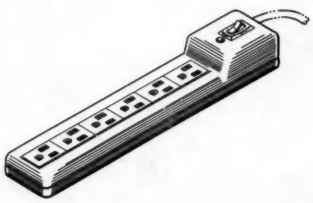
304,322
UNDERWATER DYNAMOELECTRIC MACHINE
Willis A. Meier, 8704 Zellwood Dr., St. Louis, Mo. 63123
Filed Apr. 22, 1985, Ser. No. 725,778
Term of patent 14 years
U.S. Cl. D13—3



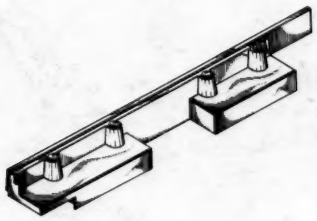
304,323
MODULAR COMPUTER
William V. Cranston, III; Randall W. Martin, both of Boca Raton, and Mark A. Young, Lake Worth, all of Fla., assignors to International Business Machines Corp., Armonk, N.Y.
Filed Sep. 25, 1986, Ser. No. 910,515
Term of patent 14 years
U.S. Cl. D13—12



304,324
MULTI-OUTLET CENTER
Robert H. Lovett, Eden Prairie; Jay J. Kakuk, Plymouth, and Bart T. Ellson, Chanhassen, all of Minn., assignors to The Toro Company, Minneapolis, Minn.
Filed Feb. 6, 1987, Ser. No. 14,002
Term of patent 14 years
U.S. Cl. D13—30

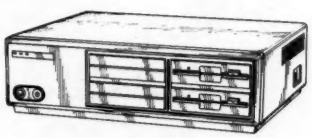


304,325
ENCLOSURE FOR WIRES INTERCONNECTING ELECTRONIC EQUIPMENT MODULES
Floyd J. Pushelberg, Ottawa, Canada; James A. Rintala, Livonia, and Leo B. Koziol, Canton, both of Mich., assignors to Northern Telecom Limited, Montreal, Canada
Filed Nov. 13, 1985, Ser. No. 805,103
Term of patent 14 years
U.S. Cl. D13—40



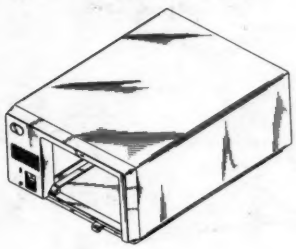
304,326
COMBINATION TELEPHONE SET AND ANSWERING MACHINE
George Perkins, Eugene, Oreg., assignor to TeleQuest, Inc., San Diego, Calif.
Filed Mar. 6, 1987, Ser. No. 22,953
Term of patent 14 years
U.S. Cl. D14—141

304,327
MICROPROCESSOR
Katsuji Kagayama, Nara; Benito Mishiro, Osaka; Yoshihiko Sugiyama, Nara, and Ikuo Nishimura, Osaka, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan
Filed Aug. 21, 1986, Ser. No. 898,556
Claims priority, application Japan, Mar. 31, 1986, 61-11669; Apr. 18, 1986, 61-14633
Term of patent 14 years
U.S. Cl. D14—100

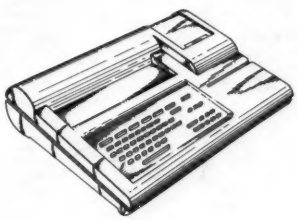


304,328
DATA TERMINAL OR SIMILAR ARTICLE
Albert L. Nagele, Wilmette, Ill., assignor to Motorola, Inc., Schaumburg, Ill.
Filed Apr. 2, 1987, Ser. No. 33,549
Term of patent 14 years
U.S. Cl. D14—100

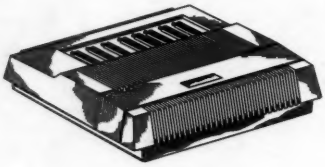
304,329
POWER UNIT COVER FOR A PORTABLE HARDFILE STORAGE DEVICE
David W. Hill, Rochester, Minn., and Margaret C. Sweeney, Georgetown, Tex., assignors to International Business Machines Corporation, Armonk, N.Y.
Filed Sep. 26, 1988, Ser. No. 249,466
Term of patent 14 years
U.S. Cl. D14—100



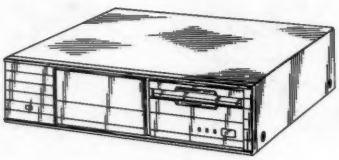
304,330
ELECTRIC TELLER TERMINAL
Gerard Biotteau, Saint Pierre Montlimart, France, assignor to Societe T.B.S. Industrie (SARL), Saint Pierre Montlimart, France
Filed Mar. 11, 1986, Ser. No. 838,599
Term of patent 14 years
U.S. Cl. D14—105



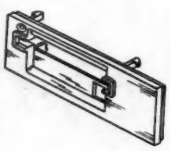
304,331
CLUSTER CONTROLLER FOR INPUT/OUTPUT SUBSYSTEM
Lonnie C. Pogue, and Olav Kok, both of San Diego, Calif., assignors to Systech Corporation, San Diego, Calif.
Filed Jul. 2, 1986, Ser. No. 881,467
Term of patent 14 years
U.S. Cl. D14—107



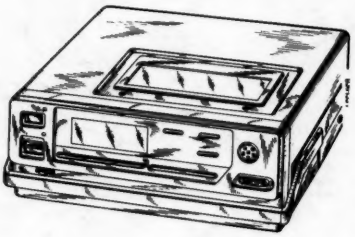
304,332
OPTICAL DISK STORAGE DEVICE
Kunio Hara, Chiba, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan
Filed Feb. 27, 1987, Ser. No. 20,321
Claims priority, application Japan, Sep. 1, 1986, 61-33961
Term of patent 14 years
U.S. Cl. D14—109



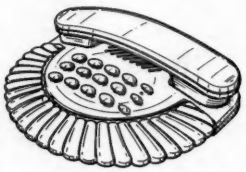
304,333
DISKETTE DRIVE FRONT PANEL
Paul A. Kerezman, Royal Palm Beach; Walter B. Koteff, West Palm Beach, and Alfred A. Stricker, Pompano Beach, all of Fla., assignors to International Business Machines Corporation, Armonk, N.Y.
Filed Mar. 7, 1986, Ser. No. 835,305
Term of patent 14 years
U.S. Cl. D14—114



304,334
VIDEO TAPE RECORDER
Toshio Ohya, and Sadayoshi Ishida, both of Tokyo, Japan, assignors to Sony Corporation, Tokyo, Japan
Filed Oct. 10, 1985, Ser. No. 786,075
Claims priority, application Japan, May 21, 1985, 60-21031
Term of patent 14 years
U.S. Cl. D14—135

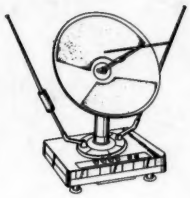


304,335
TELEPHONE SET
Jim Chen, No. 166, Sec. 1, Chung-Shan Rd., Yung-Ho City, Taipei, Taiwan
Filed Jun. 9, 1988, Ser. No. 204,401
Term of patent 14 years
U.S. Cl. D14—142

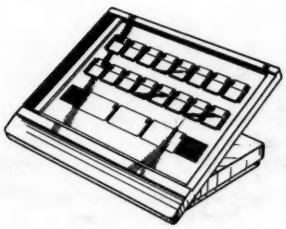


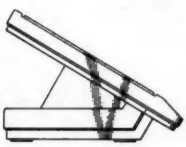
304,336
HANDSET TELEPHONE
George J. Vigil, 1725 Santa Fe River Rd., Santa Fe, N. Mex. 87501
Filed Jul. 18, 1988, Ser. No. 224,138
Term of patent 14 years
U.S. Cl. D14—143

304,337
INDOOR ANTENNA
Guo-Bang Tai, Taipei, Taiwan, assignor to King Feng Co. Ltd., Taipei, Taiwan
Filed May 19, 1986, Ser. No. 864,898
Term of patent 14 years
U.S. Cl. D14—235

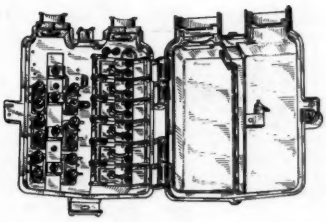


304,338
COMMUNICATIONS EQUIPMENT KEYBOARD HOUSING
William J. Sermon, London, England, assignor to British Telecommunications, Great Britain
Filed Feb. 17, 1987, Ser. No. 15,607
Claims priority, application United Kingdom, Aug. 18, 1986, 1036164
Term of patent 14 years
U.S. Cl. D14—240

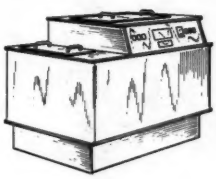




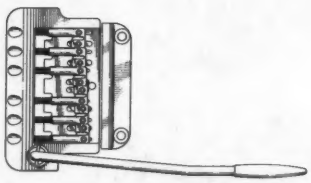
304,339
TELEPHONE NETWORK INTERFACE APPARATUS
Thomas J. Collins, Wall; Pina Schneider, Ocean Township; Anthony L. Nieves, Bradley Beach, and Thomas G. Graham, Ocean, all of N.J., assignors to Keptel, Inc., Tinton Falls, N.J.
Filed Dec. 30, 1987, Ser. No. 139,427
Term of patent 14 years
U.S. Cl. D14—240



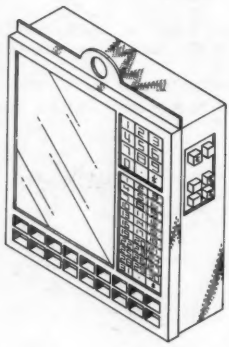
304,340
MACHINE FOR DEHYDRATING PHOTOGRAPHIC CHEMICALS
James A. DeLeeuw, River Hills, and Raymond E. Sims, Hales Corners, both of Wis., assignors to Arkay Corporation, Milwaukee, Wis.
Filed Jun. 8, 1987, Ser. No. 59,462
Term of patent 14 years
U.S. Cl. D15—199



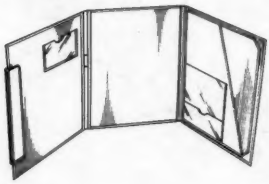
304,341
BRIDGE ASSEMBLY FOR GUITARS
Charles A. Gressett, Jr., Brea; Charles H. Todd, III, La Habra, and John F. Page, La Mirada, all of Calif., assignors to Fender Musical Instruments Corporation, Brea, Calif.
Filed May 6, 1983, Ser. No. 492,349
Term of patent 14 years
U.S. Cl. D17—21



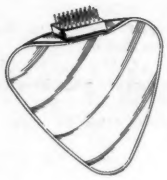
304,342
COMBINED TALKING CALENDAR AND THERMOMETER
Willie Harpe, 675 W. Maths St., Deland, Fla. 32720
Filed Sep. 18, 1986, Ser. No. 909,092
Term of patent 14 years
U.S. Cl. D19—21



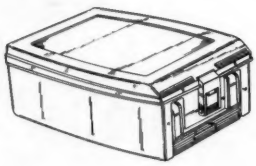
304,343
THREE-SIDED MAGNETIC FOLIO
Ghanshyam H. Popat, Alta Loma; Tien-Tsung Chen, Claremont; Christopher H. Binkley, Rancho Palos, and K. Fou Tsai, Rowland Hts., all of Calif., assignors to Avery International, Pasadena, Calif.
Filed May 28, 1986, Ser. No. 869,112
Term of patent 14 years
U.S. Cl. D19—26



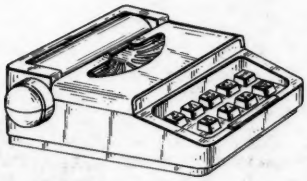
304,344
DEVICE FOR MARKING TEXTILES AND TEXTILE-LIKE MATERIALS
Linda R. Thatcher, 2994 W. 1800 South, Logan, Cache County, Utah 84321
Filed Aug. 6, 1986, Ser. No. 893,882
Term of patent 14 years
U.S. Cl. D19—36



304,345
UTILITY FILE
Kenneth C. Foran, Wooster, and Thomas J. David, Worthington, both of Ohio, assignors to Rubbermaid Incorporated, Wooster, Ohio
Filed Aug. 7, 1986, Ser. No. 894,241
Term of patent 14 years
U.S. Cl. D19—75

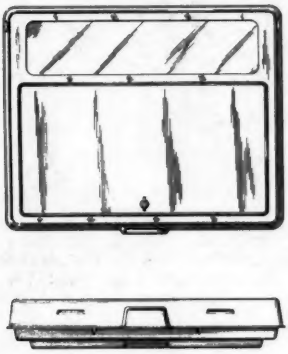


304,346
TELEPHONE INDEX UNIT
May Fung, Hong Kong, Hong Kong, assignor to ETNA Products Co. Inc., New York, N.Y.
Filed Oct. 10, 1986, Ser. No. 917,822
Term of patent 14 years
U.S. Cl. D19—76

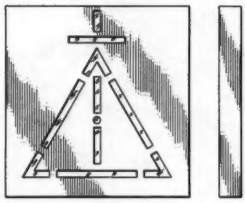


304,347
PAPER WEIGHT
William O. Murtagh, Toledo, Ohio, assignor to Gerity Products, Inc., Toledo, Ohio
Filed Jul. 8, 1986, Ser. No. 883,505
Term of patent 14 years
U.S. Cl. D19—97

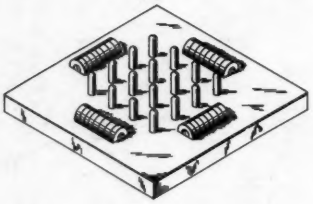
304,348
WEATHERIZED DISPLAY BOARD FOR CONSTRUCTION SITES
Gary D. Dunn, 2080 Sandpiper, Palm Harbor, Fla. 34683
Continuation of Ser. No. 920,532, Oct. 20, 1986, abandoned, and a continuation of Ser. No. 125,958, Nov. 27, 1987, Pat. No. 4,821,440. This application Dec. 16, 1988, Ser. No. 285,912
Term of patent 14 years
U.S. Cl. D20—10



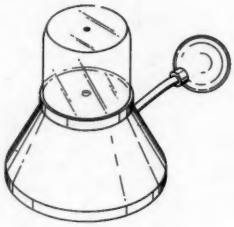
304,349
ELECTRONIC DISPLAY PANEL
Jean P. Leger, 11 Deschel Dr., Rochester, N.Y. 14626
Filed Feb. 27, 1987, Ser. No. 19,865
Term of patent 14 years
U.S. Cl. D20—12



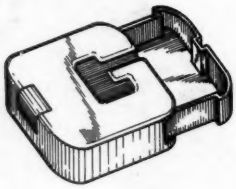
304,350
COMBINED GAME BOARD AND GAME PIECES
J. R. Arbogast, 107 Tallowood Dr., Hammond, La. 70401
Filed Jun. 21, 1968, Ser. No. 879,150
Term of patent 14 years
U.S. Cl. D21—14



304,351
PNEUMATIC DICE AGITATOR
Mario Restaino, 1871 S/W 83rd Ter., Ft. Lauderdale, Fla. 33324
Filed Oct. 14, 1986, Ser. No. 918,874
Term of patent 14 years
U.S. Cl. D21—41

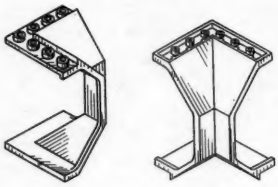


304,352
SIMULATIVE TOY BOX
Hiroshi Ukisu, Matsudo, Japan, assignor to Epoch Company, Ltd, Tokyo, Japan
Filed May 20, 1988, Ser. No. 196,339
Term of patent 14 years
U.S. Cl. D21—59



304,353
CONSTRUCTION TOY LINK
Dennis Moe, 2344 State Hwy. 16, La Crosse, Wis. 54601
Filed Jan. 23, 1987, Ser. No. 6,594
Term of patent 14 years
U.S. Cl. D21—108

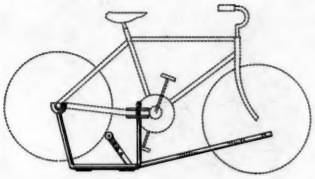
304,354
INTERNALLY CURVED TOY WALL ELEMENT
Jens N. Knudsen, Billund, Denmark, assignor to Interlego A.G., Switzerland
Filed Dec. 2, 1987, Ser. No. 127,883
Term of patent 14 years
U.S. Cl. D21—108



304,355
SIMULATIVE TOY STAPLER
Hiroshi Ukisu, Matsudo, Japan, assignor to Epoch Company, Ltd., Tokyo, Japan
Filed May 20, 1988, Ser. No. 196,336
Term of patent 14 years
U.S. Cl. D21—120

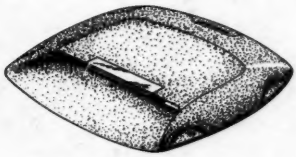
304,356
CHILD'S DOLL FIGURE OR SIMILAR ARTICLE
Larry E. Potter, 430 W. Ave. C, and Richard S. Potter, 420 Clair Center, both of McPherson, Kans. 67460
Filed Oct. 23, 1986, Ser. No. 922,564
Term of patent 14 years
U.S. Cl. D21—166

304,357
BICYCLE EXERCISE STAND
Sidney W. Maes, P.O. Box 3404 F.S., Espanola, N. Mex. 87533
Filed Feb. 25, 1988, Ser. No. 160,100
Term of patent 14 years
U.S. Cl. D21—194

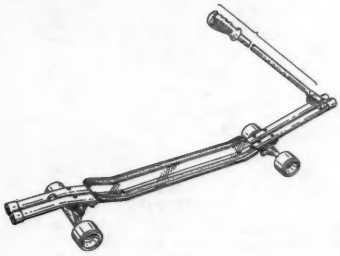


304,358
STAIR CLIMBING EXERCISE APPARATUS
Timothy O. Armstrong, Bellevue, Wash.; John W. Bull, Irvine, Calif., and David B. Smith, Bellevue, Wash., assignors to Precor Incorporated, Bothell, Wash.
Continuation-in-part of Ser. No. 12,119, Feb. 6, 1987. This application Oct. 21, 1987, Ser. No. 109,103
Term of patent 14 years
U.S. Cl. D21—195

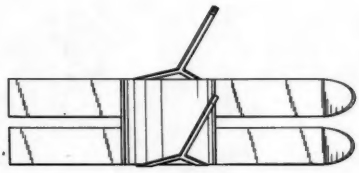
304,359
BASEBALL PITCHING PRACTICE PLATFORM
Robert L. Wright, Des Moines, Iowa, assignor to Creative Athletic Products and Services, Inc., Des Moines, Iowa
Filed Jan. 9, 1987, Ser. No. 1,989
Term of patent 14 years
U.S. Cl. D21—199



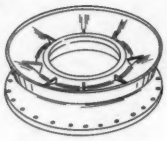
304,360
COASTER
Norman R. Curry, 3493 Rubens Court, Burlington, Ontario, Canada (L7N 3K3)
Filed Nov. 25, 1986, Ser. No. 934,990
Claims priority, application Canada, May 27, 1986, 27-05-86-3
Term of patent 14 years
U.S. Cl. D21—227



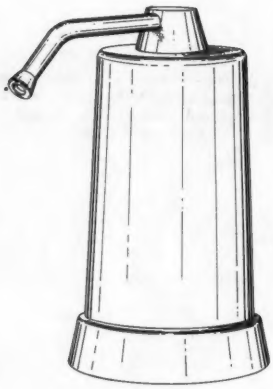
304,361
NOVELTY SKI SEAT
George M. Colclasure, Oklahoma City, Okla., assignor to Laid Back Enterprises, Inc., Oklahoma City, Okla.
Filed Apr. 8, 1986, Ser. No. 850,906
Term of patent 14 years
U.S. Cl. D21—230



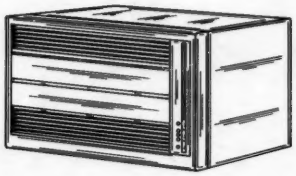
304,362
FISHING HAND CASTER
Alexander S. Corrie, 36 Manilla Street, East Brisbane, Australia (4169)
Filed Mar. 2, 1987, Ser. No. 20,680
Claims priority, application Australia, Nov. 14, 1986, 7492/86
Term of patent 14 years
U.S. Cl. D22—137



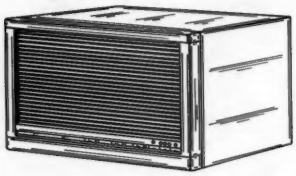
304,363
WATER FILTER
Clarence W. Ruesch, Palos Hills, Ill., assignor to Reliable Metal Stamping Co., Inc., Franklin Park, Ill.
Filed Apr. 6, 1987, Ser. No. 35,171
Term of patent 14 years
U.S. Cl. D23—209



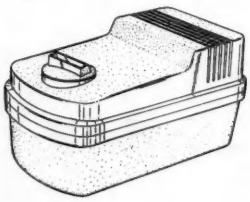
304,364
AIR CONDITIONER
Hiroshi Moritani, Osaka, Japan, assignor to Sharp Kabushiki Kaisha, Osaka, Japan
Filed Nov. 25, 1987, Ser. No. 125,449
Claims priority, application Japan, Jun. 5, 1987, 62-23231
Term of patent 14 years
U.S. Cl. D23—353



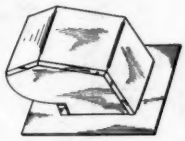
304,365
AIR CONDITIONER
Hiroshi Moritani, Osaka, Japan, assignor to Sharp Kabushiki Kaisha, Osaka, Japan
Filed Nov. 25, 1987, Ser. No. 125,450
Claims priority, application Japan, May 29, 1987, 62-22490
Term of patent 14 years
U.S. Cl. D23—353



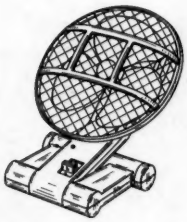
304,366
HUMIDIFIER
Kenneth A. Meyers, Reedsburg, Wis., assignor to Gerber Products Company, Fremont, Mich.
Filed Nov. 23, 1987, Ser. No. 124,181
Term of patent 14 years
U.S. Cl. D23—356



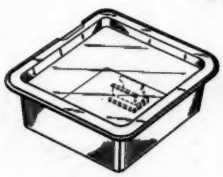
304,367
EXHAUST ROOF CAP
Francis Saas, 3 Colonial St., East Northport, N.Y. 11731
Filed Jul. 31, 1987, Ser. No. 79,920
Term of patent 14 years
U.S. Cl. D23—373



304,368
ELECTRIC FAN
Akio Suzuki, Osaka, Japan, assignor to Sharp Kabushiki Kaisha, Osaka, Japan
Filed Apr. 11, 1987, Ser. No. 48,652
Claims priority, application Japan, Nov. 11, 1986, 61-44539
Term of patent 14 years
U.S. Cl. D23—382



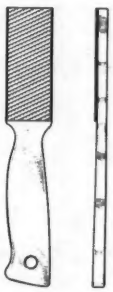
304,369
REACTION TRAY FOR MEMBRANE HYBRIDIZATIONS
Sharon S. Challberg, Boyds, and Randall Kiser, Frederick, both of Md., assignors to Life Technologies, Inc., Gaithersburg, Md.
Filed May 11, 1987, Ser. No. 49,074
Term of patent 14 years
U.S. Cl. D24—8



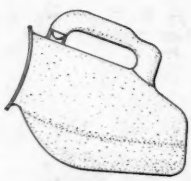
304,370
ORTHODONTIC APPLIANCE
Grant R. N. Bowbeer, 606 W. Stadium Blvd., Ann Arbor, Mich. 48103
Filed Jul. 31, 1987, Ser. No. 79,913
Term of patent 14 years
U.S. Cl. D24—10

304,371
ORTHODONTIC APPLIANCE
John A. Collins, Jr., 1116 Mishawaka Ave., South Bend, Ind. 46615
Filed Apr. 23, 1987, Ser. No. 41,367
Term of patent 14 years
U.S. Cl. D24—10

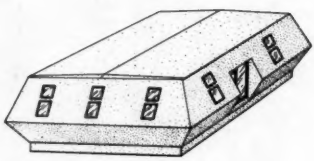
304,372
SURGICAL BONE RASP
Bernie B. Berry, Jr., 5315 E. Pleasant Run Pkwy., S. Dr., Indianapolis, Ind. 46219
Filed May 12, 1987, Ser. No. 48,789
Term of patent 14 years
U.S. Cl. D24—26



304,373
FEMALE URINAL
Rosalie Floyd, 105-110 Skaha Place, Penticton, Canada (V2A 7L1)
Filed Aug. 26, 1986, Ser. No. 901,154
Term of patent 14 years
U.S. Cl. D24—54

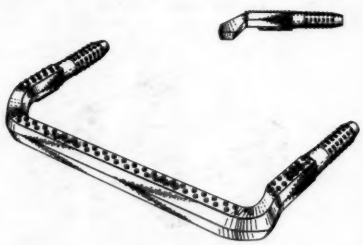


304,374
BUILDING STRUCTURE
William Reed, P.O. Box 1267, Marathon, Fla. 33050
Filed Jan. 12, 1987, Ser. No. 2,259
Term of patent 14 years
U.S. Cl. D25—33

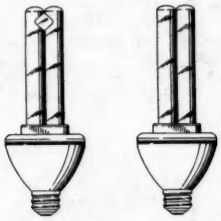


304,375
ROUNDED STAIRCASE BALUSTER
Louis Manzo, 8 Putnam Ct., Holmdel, N.J. 07733
Filed Nov. 6, 1987, Ser. No. 117,699
Term of patent 14 years
U.S. Cl. D25—38

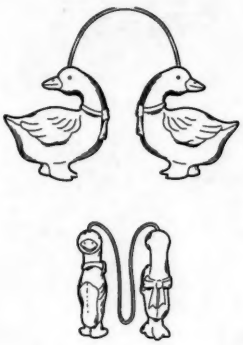
304,376
MANHOLE STEP
Michael K. Robertson, Tualatin, Oreg., assignor to Lane International Corporation, Tualatin, Oreg.
Filed Sep. 29, 1987, Ser. No. 102,576
Term of patent 14 years
U.S. Cl. D25—69



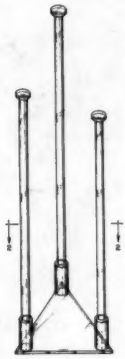
304,377
FLUORESCENT LAMP
Toshiharu Fujita; Hiroyoshi Yamazaki; Noriyuki Maeda; Kazutaka Shimizu; Norihiko Tanaka; Yoshihiro Domon; Kiyoshi Iwasawa; Mitsuyuki Futatsugi; Fuminobu Takizawa; Masakatsu Suzuki, and Makoto Kosaka, all of Kamakura, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan
Filed Sep. 19, 1986, Ser. No. 909,338
Claims priority, application Japan, Mar. 20, 1986, 61-10346; May 9, 1986, 61-17419; May 9, 1986, 61-17420; May 9, 1986, 61-17421
Term of patent 14 years
U.S. Cl. D26—3



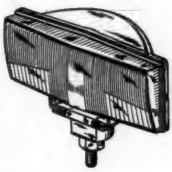
304,378
PAIR OF LINKED CANDLES
Michael C. B. Lam, Ground Floor, Kwai Bo Industrial Building, 40 Wong Chuk Hang Road, Aberdeen, Hong Kong
Filed Aug. 28, 1986, Ser. No. 901,547
Term of patent 14 years
U.S. Cl. D26—7



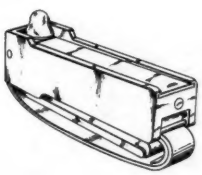
304,379
BASE FOR MULTIPLE CANDLE LAMPS
Mary A. Chappellet, Pritchard Hill, St. Helena, Calif. 94574
Filed Jan. 3, 1986, Ser. No. 816,152
Term of patent 14 years
U.S. Cl. D26—9



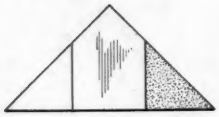
304,380
SLIDING HEADLIGHT
Francois Bailly, Haras Lesseirlle, 95510 Aincourt, France
Filed Jul. 9, 1986, Ser. No. 883,840
Claims priority, application France, Jan. 31, 1986, 86 0478
The portion of the term of this patent subsequent to Sep. 12, 2003, has been disclaimed.
Term of patent 14 years
U.S. Cl. D26—29

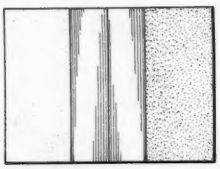


304,381
STRAPPED MINIATURE FLASHLIGHT
Andrew E. Campbell, 1127 Ridge Rd., Fawnskin, Calif. 92333
Filed Oct. 16, 1986, Ser. No. 919,862
Term of patent 14 years
U.S. Cl. D26—37



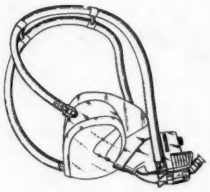
304,382
MULTICOLORED TOOTHPASTE
Raymond L. Mohrle, Denville, N.J., assignor to Warner-Lambert Company, Morris Plains, N.J.
Filed Dec. 18, 1985, Ser. No. 810,151
Term of patent 14 years
U.S. Cl. D28—8.1





304,383
COMB ATTACHMENT OR THE LIKE FOR HOLDING PERMANENT WAVE PAPER
Lowell C. Babcock, 22014 Anthony Rd., Marengo, Ill. 60152
Filed Aug. 4, 1986, Ser. No. 892,404
Term of patent 14 years
U.S. Cl. D28—34

304,384
COMBINED RESPIRATORY MASK AND INFLATABLE HEAD STRAPS
Guy G. A. Derobert, Gambais, France, assignor to Intertechnique S.A., Plaisir, France
Filed Aug. 21, 1986, Ser. No. 898,626
Term of patent 14 years
U.S. Cl. D29—9



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TO WHOM

PATENTS WERE ISSUED ON THE 31ST DAY OF OCTOBER, 1989

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

A. H. Robins Company, Incorporated: *See—*
Naylor, Robert J.; and Naylor, Brenda, 4,877,794, Cl. 514-305.000.

A/S Ferrosan: *See—*
Drejer, Jorgen; and Jakobsen, Palle, 4,877,799, Cl. 514-317.000.

A/S Finsam International Inc.: *See—*
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Aardelite Holding B.V.: *See—*
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Aaton, R.G.: *See—*
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AB Volvo: *See—*
Andersson, Lars; and Andersson, Sven, 4,876,907, Cl. 74-331.000.

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Barnes, Albert L.; Clere, Thomas M.; Abbaschian, Gholamreza J.; and Wheeler, Douglas J., 4,876,941, Cl. 89-36.020.

Abbeneyen, Willy N. V.: *See—*
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Abbott Laboratories: *See—*
Hayes, Donald J.; Wallace, David B.; Verlee, Donald J.; and Houseman, Kenneth R., 4,877,745, Cl. 436-166.000.

Abe, Yoshiaki: *See—*
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Abe, Yoshio: *See—*
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Abrams, Jack S.: *See—*
Guenther, Kenneth L.; Rabindran, Karavattuveetil G.; Faber, Thomas J.; and Abrams, Jack S., 4,877,346, Cl. 400-624.000.

Abthoff, Joerg; Schuster, Hans-Dieter; Langer, Hans-Joachim; Strohmer, Erwin; Gabler, Rolf; and Schulte, Roland, to Daimler-Benz Aktiengesellschaft. Diesel internal combustion engine with an exhaust gas line system. 4,876,852, Cl. 60-275.000.

Academy of Applied Science, Inc.: *See—*
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Ackermann, Frank; Wollermann-Windgasse, Reinhard; and Faller, Bernd. Device for a modular power laser. 4,878,227, Cl. 372-107.000.

ACRAVAC: *See—*
Miller, Murrell T., 4,877,124, Cl. 198-711.000.

Adair, Paul C.: *See—*
Liang, Rong-Chang; Kintz, Karl A.; O'Connor, Joseph G.; and Adair, Paul C., 4,877,767, Cl. 503-212.000.

Adams, Theodore C.: *See—*
Rzeszotarski, Waclaw J.; Guzewska, Maria E.; Carter, John P.; Adams, Theodore C.; Dupont, Andrea C.; and Kaiser, Carl, 4,877,779, Cl. 514-63.000.

Adir Et Cie: *See—*
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Advanced Cardiovascular Systems, Inc.: *See—*
Conway, Jean M.; and McInnes, Peter R., 4,877,031, Cl. 128-344.000.

Advanced Engineering Systems, Operations & Products, Inc.: *See—*
Heatzig, Eric; Slocum, Alexander; and Thurston-Slocum, Debra, 4,878,002, Cl. 318-568.200.

Advanced Micro Devices, Inc.: *See—*
Johnson, William M.; Olson, Timothy A.; Dutton, Drew J.; Lee, Sherman; and Stoenner, David W., 4,878,166, Cl. 364-200.000.
Kubinec, James J., 4,877,980, Cl. 307-542.000.
Wang, Yun-Che; and Scott, Paul H., 4,878,028, Cl. 328-55.000.

Advanced Products, Inc.: *See—*
Bowns, Richard E.; and Diepholz, David L., 4,877,512, Cl. 204-435.000.

Advantest Corporation: *See—*
Hayashi, Mishio, 4,878,233, Cl. 375-116.000.

AE PLC: *See—*
Rhodes, Michael L. P., 4,876,947, Cl. 92-187.000.

Aebischer, Patrick: *See—*
Valentini, Robert F.; Aebischer, Patrick; and Galletti, Pierre M., 4,877,029, Cl. 128-334.00R.

Aercology Incorporated: *See—*
Avondoglio, Leo, 4,877,431, Cl. 55 321.000.

Aeroquip Corporation: *See—*
Tsaprazis, Edward; Maris, Nicholas P.; and Montague, Charles, 4,878,019, Cl. 324-204.000.

Agano, Toshitaka; and Nakajima, Nobuyoshi, to Fuji Photo Film Co., Ltd. Radiation image read-out method and apparatus. 4,877,958, Cl. 250-327.200.

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Tanaka, Susumu; Sato, Masaaki; Kaeriyama, Kyoji; Suda, Yoshio; and Hiraide, Takao, 4,877,852, Cl. 526-256.000.

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Mitome, Hideto, 4,878,210, Cl. 367-137.000.

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Peters, Manfred; Becker, Manfred; Wingender, Kaspar; Kaluschke, Thomas; and Klotzer, Sieghart, 4,877,722, Cl. 430-559.000.

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Ahlstrom Corporation: *See—*
Timperi, Jukka; Vesala, Reijo; and Vikman, Vesa, 4,877,368, Cl. 415-143.000.

Ahlstromforetagen Svenska AB: *See—*
Ryham, Rolf, 4,877,080, Cl. 165-2.000.

Aiba, Masahiko; and Mizuno, Yukio, to Sharp Kabushiki Kaisha. Controlling apparatus for laser diode. 4,878,225, Cl. 372-38.000.

Aicher, Max; Jungwirth, Dieter; Klein, Hans-Wilhelm; and Russwurm, Dieter, to Dyckerhoff & Widmann Aktiengesellschaft. Method for producing rolled steel products, particularly threaded steel tension members. 4,877,463, Cl. 148-12.00B.

Aiki, Shigetaka; Kobayashi, Kiyonori; and Kato, Satoshi, to Aisin Seiki Kabushiki Kaisha; and Toyota Jidosha Kabushiki Kaisha. Torque variation absorbing device. 4,876,917, Cl. 74-574.000.

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Norman, John A. T.; and Stevens, Robert E., 4,877,425, Cl. 55-68.000.
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Kato, Yukihiro; Ishii, Masami; Yabuno, Ryohei; and Oka, Tetsuo, 4,876,893, Cl. 73-726.000.
Nishikawa, Masumi; and Ishikawa, Masanobu, 4,876,910, Cl. 74-493.000.

Aittama, Robert W.: *See—*
Kenealy, Dean R.; and Aittama, Robert W., 4,877,001, Cl. 123-519.000.

Ajima, Tadashi: *See—*
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Ajinomoto Company, Inc.: *See—*
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Akademie Der Wissenschaften Der DDR: *See—*
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Akimoto, Kunio: *See—*
Takagiwa, Hiroyuki; Takahashi, Jiro; Shirose, Meizo; Akimoto, Kunio; and Uchida, Masafumi, 4,877,704, Cl. 430-99.000.

Akinaga, Shiro: *See—*
Murakata, Chikara; Sato, Akira; Kasai, Masaji; Kobayashi, Eiji; Morimoto, Makoto; and Akinaga, Shiro, 4,877,776, Cl. 514-43.000.

Akiya, Takashi: *See—*
Sakaki, Mamoru; Arai, Ryuichi; Akiya, Takashi; Toganoh, Shigeo; Higuma, Masahiko; Eto, Naonobu; Mouri, Hidemasa; Tobita, Michiaki; Ishida, Masahiko; and Kono, Shunzo, 4,877,680, Cl. 428-332.000.

Aktiebolaget Bofors: *See—*
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Akzo NV: *See—*
De Brock, Raoul, 4,877,392, Cl. 425-371.000.
van Calker, Freerk R.; Kopmels, Pieter J. M.; and Ter Burg, Antonius W. M., 4,877,126, Cl. 198-847.000.

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Alkhazashvili, Gia G.: *See*—
Mudzhiri, Levan A.; Alkhazashvili, Gia G.; Kalatozishvili, Elena I.; Chekurishvili, Gia O.; Brekhman, Izrail I.; Bulanov, Alexandr E.; and Polozhentseva, Mira I., 4,877,772, Cl. 514-23.000.

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Arabia, F. Gene; Shkedi, Zvi; and Brandt, Randy L., 4,876,892, Cl. 73-718.000.
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Daly, Paul D., 4,877,187, Cl. 239-89.000.
Feltz, Kevin L.; Richardson, Glenn A.; and Burrell, Jonathan C., 4,876,857, Cl. 60-734.000.
Kavesh, Sheldon; Prevornek, Dusan C.; and Harpell, Gary A., 4,876,774, Cl. 28-166.000.
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Allio, Roland: *See*—
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Alltronik Gesellschaft Fur Elektronische Steuerung und Antriebe mbH: *See*—
Schulze, Matthias, 4,878,052, Cl. 340-825.690.

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Aloi, Anthony J.; Bernard, Robert R.; and Proulx, Edward A., to General Electric Company. Magazine ammunition conveying system. 4,876,940, Cl. 89-33.160.

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Hinotani, Hiroaki, 4,878,214, Cl. 369-256.000.

Alt, Claus-Christian; Gobel, Rudolf; Koch, Heinz; Niechoj, Wolfgang; Grossmann, Theodor; and Deffner, Felix, to Dailer-Benz Aktiengesellschaft. Fold bellows for rotating vehicle drive joint. 4,877,258, Cl. 277-212.0FB.

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Aluminum Company of America: *See*—
Lo, Ying-Cheng, 4,877,393, Cl. 425-383.000.

Alvarez, Dennis A.: *See*—
Kelly, Patrick M.; Howlett, Robert E.; Pomeroy, Paul A.; and Alvarez, Dennis A., 4,876,837, Cl. 52-287.000.

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Aman, Martin, to Linjar Transportteknik I Stockholm AB. Guide arrangement in a linear power unit. 4,877,338, Cl. 384-26.000.

Amano, Hiroyuki: *See*—
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Amano, Hisao: *See*—
Yamato, Ikuo; Tokunaga, Norikazu; Matsuda, Yasuo; and Amano, Hisao, 4,878,163, Cl. 363-8.000.

American Cyanamid Company: *See*—
Asato, Goro; and France, Donald J., 4,877,888, Cl. 549-264.000.

American National Can Company: *See*—
Shepard, Mary E.; Galloway, Deane E.; and Lind, Keith D., 4,877,684, Cl. 428-475.800.

American Recreation Products, Inc.: *See*—
Cantwell, Robert R.; Hallemann, Raymond F.; and Zumsteg, Deborah M., 4,877,044, Cl. 135-104.000.

American Standard Inc.: *See*—
Beasley, John A., 4,877,014, Cl. 126-116.00R.

American Telephone & Telegraph AT&T Technologies, Inc.: *See*—
Bleich, Larry L.; Roberts, Joni A.; and Zerbs, Stephen T., 4,877,645, Cl. 427-117.000.

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Amfit Inc.: *See*—
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Amoco Corporation: *See*—
Sauers, Marvin E.; Hartsing, Tyler F., Jr.; and McMaster, Lee P., 4,877,682, Cl. 428-412.000.

AMP Incorporated: *See*—
Tanigawa, Junichi; and Kikuchi, Shoji, 4,877,409, Cl. 439-31.000.
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Bible, Matthew; Lesage, Marc; and Falconer, Ian, 4,876,886, Cl. 73-151.500.

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Schierling, Roland; and Geyer, Werner, 4,876,999, Cl. 123-252.000.

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Romano, Antonio, 4,876,913, Cl. 74-535.000.
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Campbell, Jeptha E., to Spiral Systems, Inc. Asbestos sample filter clearing system. 4,876,901, Cl. 73-863.000.
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Candor, James T. Apparatus and method for removing liquid from liquid bearing material. 4,877,503, Cl. 204-182.100.
Cannon, James W., to Eastman Kodak Company. Camera apparatus for preventing double exposure. 4,878,075, Cl. 354-173.100.
Canon Kabushiki Kaisha: *See*—
Hiro, Masaaki; Kimura, Tomohiro; Tanaka, Hisami; Kashimura, Noboru; Tanaka, Shigemori; Tohma, Hitoshi; and Hisamura, Masafumi, 4,877,701, Cl. 430-59.000.
Ichikawa, Hiroyuki, 4,878,126, Cl. 358-451.000.
Inoue, Eiichi; Shimizu, Isamu; and Komatsu, Toshiyuki, 4,877,709, Cl. 430-128.000.
Isohata, Junji; Totsuka, Masao; and Nakamura, Yoshiharu, 4,878,086, Cl. 355-77.000.
Katayama, Akihiro; Ohsawa, Hidefumi; Sunohara, Izuru; Hosokawa, Hiroshi; and Yoshimoto, Masahiko, 4,878,125, Cl. 358-443.000.
Kiyohara, Takehiko, 4,878,069, Cl. 346-140.00R.
Kotera, Masahide; Konishi, Motofumi; Ando, Yoshio; Iwaya, Toshio; Tanaka, Kanou; Hashimoto, Norio; Sugita, Yasutoshi; Sano, Yoshitaka; and Ono, Satoshi, 4,878,250, Cl. 382-56.000.
Koyama, Takeshi; Ohtaka, Keiji; and Suda, Yasuo, 4,878,078, Cl. 354-402.000.
Masui, Toshiyuki; Kashida, Motokazu; Takahashi, Koji; and Nagasawa, Kenichi, 4,878,134, Cl. 360-77.150.
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Miura, Shigeo; Takahashi, Masatomo; Yoshino, Motoaki; Watanabe, Tsunehiro; Toyama, Takeshi; and Takahashi, Taketo, 4,878,123, Cl. 358-401.000.
Sakaki, Mamoru; Arai, Ryuichi; Akiya, Takashi; Toganoh, Shigeo; Higuma, Masahiko; Eto, Naonobu; Mouri, Hidemasa; Tobita, Michiaki; Ishida, Masahiko; and Kono, Shunzo, 4,877,680, Cl. 428-332.000.
Sakata, Tsuguhide; Taguchi, Tomishige; Kimura, Norio; Tsuruno, Kunio; and Suzuki, Yasutomo, 4,878,131, Cl. 360-37.100.
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Takimoto, Hiroyuki, 4,878,133, Cl. 360-64.000.
Yasumura, Hiroto; Hirasawa, Masahide; Noji, Minoru; Kozuki, Susumu; Takahashi, Koji; Yoshinura, Katsuji; and Sasatani, Tomohiko, 4,878,128, Cl. 358-315.000.
Cantrell, John L., to Ribi ImmunoChem Research Inc. Vaccine containing tumor antigens and adjuvants. 4,877,611, Cl. 424-88.000.
Cantwell, Robert R.; Hallemann, Raymond F.; and Zumsteg, Deborah M., to American Recreation Products, Inc. Tent, tent ribs, and method of erecting tents. 4,877,044, Cl. 135-104.000.
Cappi, Angelo, to Awax S.r.L. Device for continuous hot-sealing of thermoplastic films. 4,877,478, Cl. 156-555.000.
Carbotek, Inc.: *See*—
Stahl, Charles R.; Gibson, Michael A.; and Knudsen, Christian W., 4,876,780, Cl. 29-157.400.
Carlson, Joseph W., to University of California, The Regents of the. Widened and shaped MRI surface coil having increased signal-to-noise ratio. 4,878,022, Cl. 324-318.000.
Carlson, Norman R.: *See*—
McWhirter, Vernie C.; Pickett, James E.; and Carlson, Norman R., 4,878,180, Cl. 364-507.000.
Carlson, Timothy L.: *See*—
Ward, John W.; and Carlson, Timothy L., 4,877,762, Cl. 502-77.000.
Carmichael, Maurice; and Binatena, Janis. Internal combustion engine scrubber. 4,877,043, Cl. 134-57.00R.
Carney, Donald P.: *See*—
Carney, William P.; and Carney, Donald P., 4,876,900, Cl. 73-862.480.
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Knapp, James H.; Carney, George F.; and Carney, Francis J., 4,877,482, Cl. 156-643.000.
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Knapp, James H.; Carney, George F.; and Carney, Francis J., 4,877,482, Cl. 156-643.000.
Carney, Robert L.; and Brown, Thomas L., to Sandoz Ltd. Novel compositions. 4,877,899, Cl. 560-262.000.
Carney, William P.; and Carney, Donald P. Racket string tension tester. 4,876,900, Cl. 73-862.480.
Carp, Stuart L.; Swain, Howard L.; and Nguyen, Bich N., to Hewlett-Packard Company. Direct frequency synthesizer using powers of two synthesis techniques. 4,878,027, Cl. 328-15.000.
Carpenter, Thomas O.; and Pitha, Josef, to Children's Medical Center Corporation, The. Method of enhancing lipophile transport using cyclodextrin derivatives. 4,877,778, Cl. 514-58.000.
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Carpinella, Ralph; and Becher, Karl, 4,876,782, Cl. 29-234.000.
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Gray, Kenneth P., 4,876,779, Cl. 29-157.30R.
Neville, Donald G.; Giordano, David A.; and Hogan, Mark R., 4,877,106, Cl. 181-224.000.
Carscallen, Gregory A.: *See*—
Bruggeman, Rudyard J.; and Carscallen, Gregory A., 4,876,875, Cl. 72-199.000.
Carson, Keith J., to Process Automation Business, Inc. Sheet inspection station with pneumatic sheet guide. 4,877,485, Cl. 162-263.000.
Carter, John P.: *See*—
Rzeszotarski, Waclaw J.; Guzewska, Maria E.; Carter, John P.; Adams, Theodore C.; Dupont, Andrea C.; and Kaiser, Carl, 4,877,779, Cl. 514-63.000.
Carter, Philip S., Jr.: *See*—
Cowell, Mark J.; Ladd, Kevin; and Carter, Philip S., Jr., 4,877,944, Cl. 219-548.000.

Cartillier, Andre: *See—*
Ardaillon, Pierre; Autant, Pierre; Bourrain, Paul; and Cartillier, Andre, 4,877,621, Cl. 424-498.000.
Casio Computer Co., Ltd.: *See—*
Fuse, Takahiro; and Yamagishi, Koji, 4,878,047, Cl. 340-784.000.
Shinohara, Isao, 4,876,938, Cl. 84-611.000.
Casper Colosimo & Son., Inc.: *See—*
Van Peit, Norman, 4,877,355, Cl. 405-159.000.
CassChem, Inc.: *See—*
Brauer, Melvin; and Simone, Dominic, 4,877,455, Cl. 106-244.000.
Cassella Aktiengesellschaft: *See—*
Engelhardt, Fritz; Hintermeier, Karl; Muller, Manfred; Munch, Norbert; and Wagener, Hans, 4,877,540, Cl. 252-8.750.
Castola, Adrian; Kwok, John C.; Robinson, Keith J.; Smith, Brian H. A.; and Longuet, Michel, to Polysar Limited. Thermoset resin compositions. 4,877,832, Cl. 525-64.000.
Castellano, Anthony J., to Century Container Corporation. Sun screen for vehicle. 4,877,074, Cl. 160-84.100.
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Muller, Niklaus, 4,877,937, Cl. 219-121.590.
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Cazaux, Yvon; Herault, Didier; Thenoz, Yves; and Blanchard, Pierre, to Thomson-CSF. Charge transfer memory and fabrication method thereof. 4,878,103, Cl. 357-24.000.
Cazers, Alexander R.; and Koshy, K. Thomas, to Upjohn Company, The. Zinc ceftiofur complexes. 4,877,782, Cl. 514-186.000.
Cecil, James B.: *See—*
Gross, William H.; and Cecil, James B., 4,878,034, Cl. 330-298.000.
Cello Bag Company, Inc.: *See—*
Barnard, Delbert J., 4,877,335, Cl. 383-6.000.
Wood, Jerry W., 4,877,337, Cl. 383-21.000.
CEM Corporation: *See—*
Floyd, Terry S.; and Hargett, Wyatt P., Jr., 4,877,624, Cl. 426-241.000.
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Shroot, Braham; Hensby, Christopher; Maignan, Jean; Lang, Gerard; Restle, Serge; and Colin, Michel, 4,877,789, Cl. 514-255.000.
Century Container Corporation: *See—*
Castellano, Anthony J., 4,877,074, Cl. 160-84.100.
CF Systems Corporation: *See—*
Moses, John M., 4,877,530, Cl. 210-511.000.
Cha, Tongil, to Pop-Limited. Non-toxic rubber-based composition and method for making the rubber based composition. 4,877,566, Cl. 264-118.000.
Chadwick, Curt H.; Sholes, Robert R.; Greene, John D.; Tucker, Francis D., III; Fein, Michael E.; Jann, P. C.; Harvey, David J.; and Beil, William, to KLA Instruments Corporation. Method and apparatus for optical inspection of substrates. 4,877,326, Cl. 356-394.000.
Chambers, Richard D. Polyether compounds and their preparation. 4,877,905, Cl. 568-615.000.
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Grushkin, Bernard; Chang, Hui; and Ruhland, John G., 4,877,707, Cl. 430-106.600.
Chang, Shih-Ling, to University of Kentucky Research Foundation, The. Qualitative metabolism assessment using high performance thin layer chromatography. 4,877,744, Cl. 436-162.000.
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Chapman, John W., to Micron Technology Inc. Pressurized vessel with false bottom and throughpipe coated at weld site. 4,877,525, Cl. 210-289.000.
Charkoudian, John C., to Kendall Company, The. Model human skin. 4,877,454, Cl. 106-131.000.
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McQuoid, Bryan K.; Charlson, Earl J.; and Graham, Huber, 4,878,226, Cl. 374-166.000.
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Nofre, Claude; Tinti, Jean M.; and Chatzopoulos, Farroudja O., 4,877,895, Cl. 558-413.000.
Che, Tessie M.: *See—*
Kuder, James E.; McGinnis, James L.; Goldberg, Harris A.; Hart, Timothy R.; and Che, Tessie M., 4,878,224, Cl. 372-53.000.
Checkland, John A.: *See—*
Marsden, Eric P.; and Checkland, John A., 4,877,467, Cl. 156-51.000.
Chekurishvili, Gia O.: *See—*
Mudzhiri, Levan A.; Alkhazashvili, Gia G.; Kalatozishvili, Elena I.; Chekurishvili, Gia O.; Brekhman, Izrail I.; Bulanov, Alexandr E.; and Polozhentseva, Mira I., 4,877,772, Cl. 514-23.000.
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Chen, Inn-Ming: *See—*
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Chen, Jin-Hai, to Bio-Rad Laboratories, Inc. Apparatus for preparative gel electrophoresis. 4,877,510, Cl. 204-299.00R.
Chen, Nai Y.; and Walsh, Dennis E., to Mobil Oil Corporation. Catalyst for dewaxing hydrocarbon feedstock. 4,877,581, Cl. 585-751.000.
Chen, Shang-Hsieh. Improved trigger-type control switch for D.C. motors. 4,878,000, Cl. 318-362.000.
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Wilson, James F.; George, Rhett T., Jr.; and Chen, Zhenhai, 4,876,944, Cl. 91-35.000.
Cherbuy, Bernard; and Estavoyer, Jacques, to Bull S.A. Device for intermittent application of particles of a powdered developer to the recording surface of a magnetographic printer. 4,877,341, Cl. 400-119.000.
Chevallier, Marc; and Froger, Guy, to Societe Anonyme: Societe Europeene De Propulsion. Metal static seal and assembly comprising such a seal. 4,877,272, Cl. 285-111.000.
Chevron Research Company: *See—*
Campbell, Curtis B., 4,877,416, Cl. 44-62.000.
Neighbors, Ralph P.; and Riden, Joseph R., 4,877,806, Cl. 514-410.000.
Chi-Vit Corporation: *See—*
Lee, Paul R.; and Hingsbergen, Joseph P., 4,877,758, Cl. 501-24.000.
Chiba, Kiyosi: *See—*
Fukuda, Takuya; Mochizuki, Yasuhiro; Momma, Naohiro; Takahashi, Shigeru; Suzuki, Noboru; Sonobe, Tadasi; Chiba, Kiyosi; and Suzuki, Kazuo, 4,876,983, Cl. 118-722.000.
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Futatsuka, Rensei; Chiba, Synu-ichi; and Sakakibara, Tadao, 4,877,577, Cl. 420-473.000.
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Delbe, Emmanuel; Gillet, Francois; Serot, Etienne; Chifflet, Raymond; Allio, Roland; Jeantin, Philippe; Del Fabro, Gilbert; and Forella, Guy, 4,877,229, Cl. 271-2.000.
Chikamune, Kaoru; Tokuda, Manabu; Inoue, Kazuo; Utsunomiya, Kyoshi; and Hitofude, Yoshii, to Nippon Seiro Company, Limited. Antioxidant wax for rubber. 4,877,456, Cl. 106-270.000.
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Carpenter, Thomas O.; and Pitha, Josef, 4,877,778, Cl. 514-58.000.
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Chinon Kabushiki Kaisha: *See—*
Takehana, Takamichi; Murayama, Osamu; Nakajima, Hideaki; Yamada, Masatoshi; and Hamada, Makoto, 4,878,080, Cl. 354-403.000.
Chisso Corporation: *See—*
Kitano, Kisei; Ushioda, Makoto; Uchida, Manabu; and Suzuki, Toshiharu, 4,877,548, Cl. 252-299.630.
Sawada, Shinichi; Matsushita, Tetsuya; and Isoyama, Toyoshiro, 4,877,549, Cl. 252-299.630.
Chmiel, Max; and Prange, Rainer, to Dolomitwerke GmbH. Refractory composition for refractory linings of metallurgical vessels. 4,877,761, Cl. 501-109.000.
Cho, Hae S.; and Kwon, In K., to Samsung Electronics Co., Ltd. Vacuum cleaner. 4,876,763, Cl. 15-329.000.
Chocolate Pix, Inc.: *See—*
Newsteder, Robert, 4,876,824, Cl. 47-66.000.
Choriyammakal, Pushpa M.: *See—*
Craven, Tyson S.; and Choriyammakal, Pushpa M., 4,878,062, Cl. 343-872.000.
Chow, Che C., to Xerox Corporation. Method to increase hot offset temperature of silicone fuser. 4,876,777, Cl. 29-132.000.
Christensen, Bruce C., to Wormald, U.S. Inc. Pressure equalizing valve. 4,877,057, Cl. 137-625.480.
Christensen, Joel R.; Cuomo, John; and Levitt, George, to Du Pont de Nemours, E. I., and Company. Thiophenesulfonamide herbicides. 4,877,440, Cl. 71-90.000.
Christianson, Tony. Skin diving snorkel. 4,877,022, Cl. 128-201.110.
Chu, Jen-Yeh. Vane type rotary compressor. 4,877,384, Cl. 418-184.000.
Chu, Kenneth C., to Du Pont Canada Inc. Polyolefin concentrate. 4,877,840, Cl. 525-240.000.
Chumachenko, Viktor A.: *See—*
Matros, Jury S.; Chumachenko, Viktor A.; Zudilina, Ljudmila J.; Noskov, Alexandr S.; and Bugdan, Evgeny S., 4,877,592, Cl. 423-245.100.
Chun-cheng, Huang, to Teh Yor Industrial Co., Ltd. Cutter, in particular for a slat, especially of a venetian blind. 4,876,795, Cl. 30-254.000.
Chun, Duk K. Toilet odor filter assembly. 4,876,748, Cl. 4-213.000.
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Teng, Chih-Sieh; Liou, Tian-I; and Chun-Min, Hiekyung, 4,877,751, Cl. 437-47.000.
Chung, Tze-Chiang, to Exxon Research and Engineering Company. Polyalcohol homopolymers. 4,877,846, Cl. 525-369.000.
Churchill, Jeffrey R.; and Hutchinson, Francis G., to Imperial Chemical Industries PLC. Biodegradable amphipathic copolymers. 4,877,606, Cl. 424-78.000.
Cianflone, Stephen P. Shoulder cradle for supporting a cellular car phone. 4,878,237, Cl. 379-58.000.
Ciarletta, Agnes B.: *See—*
Clark, Steven C.; Ciarletta, Agnes B.; and Yang, Yu-Chung, 4,877,729, Cl. 435-68.000.
Ciba-Geigy AG: *See—*
Meyer, Armin, 4,878,111, Cl. 358-75.000.
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Evans, Samuel, 4,877,824, Cl. 524-83.000.
Haring, Ulrich, 4,877,552, Cl. 252-392.000.
Sire, Jean-Marie; and Scheibli, Peter, 4,877,413, Cl. 8-543.000.
Cimperman, Fred J., to Ashlock Company. Method and apparatus for pitting and slicing olives. 4,876,954, Cl. 99-545.000.
Cincinnati Milacron Inc.: *See—*
Vaniglia, Milo M., 4,877,193, Cl. 242-7.210.

Cinotti, Andrea, to Wrapmatic S.p.A. Apparatus for the automatic separation into reams of a stack of large format sheets of paper the ream divisions of which are counted off previously and indicated by markers. 4,877,367, Cl. 414-796.000.

Cipriano, Robert A.; Snelgrove, R. Vernon; and McCullough, Francis P., Jr., to Dow Chemical Company, The. Non-aqueous electrochemical cell. 4,877,695, Cl. 429-102.000.

CL Pharma Aktiengesellschaft: *See*—
Binder, Dieter; Rovensky, Franz; and Ferber, Hubert P., 4,877,809, Cl. 514-444.000.

Claas Ohg: *See*—
Stein, Franz, 4,876,912, Cl. 74-535.000.

Claassen, Henning J. Apparatus for the application of liquid adhesives to a substrate. 4,876,982, Cl. 118-406.000.

Clanet, Frank; and Dellerm, Anne. Collapsible and inflatable piston for two- or multi- compartmental container. 4,877,156, Cl. 222-386.500.

Claney, Jim L.: *See*—
Fairchild, Paul W.; Claney, Jim L.; Fields, William G.; Bishop, Louis, Jr.; and Fly, Mark W., 4,876,949, Cl. 98-40.100.

Clarion Co., Ltd.: *See*—
Kobayashi, Shigetoshi, 4,877,925, Cl. 200-5.00A.

Clark, Leonard G.: *See*—
Harben, Grover S., III; and Clark, Leonard G., 4,876,767, Cl. 17-11.000.

Clark, Steven C.; Ciarletta, Agnes B.; and Yang, Yu-Chung, to Genetics Institute, Inc. Recombinant DNA encoding novel family of primate hematopoietic growth factors. 4,877,729, Cl. 435-68.000.

Clarke, Donald J.: *See*—
Liu, Christopher S.; Clarke, Donald J.; and Grina, Larry D., 4,877,834, Cl. 525-66.000.

Clarke, Peter G.; Mirwaldt, Ulrich; and Wandel, Dietmar, to Davy McKee Aktiengesellschaft. Process for the production of PBT carpet yarn. 4,877,572, Cl. 264-555.000.

Clemence, Francois; Le Martret, Odile; Delevallee, Francoise; and Fortin, Michel, to Roussel Uclaf. Decahydroquinolines and central analgesic method of use thereof. 4,877,796, Cl. 514-311.000.

Clere, Thomas M.: *See*—
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Clifford, James R. Fishing reel protector. 4,876,819, Cl. 43-26.000.

Clough, John M.: *See*—
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Cloverline, Inc., The: *See*—
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CO.GE.IT. S.R.L. - Costruzioni Generali Italiane: *See*—
Renzulli, Francesco; Del Gaudio, Antonio; and Renzulli, Piero, 4,877,410, Cl. 8-94.120.

Coal Industry (Patents) Limited: *See*—
Goleczka, Joseph; Harris, Walter; and Pringle, John, 4,877,418, Cl. 44-600.000.
Howie, Robin M., 4,876,746, Cl. 2-69.000.

Cochran, Mark D.: *See*—
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Cockrell, John R., Jr.; and Thekkekandam, Joseph T., to Kay Chemical Company. Floor cleaning compositions and their use. 4,877,459, Cl. 134-40.000.

Cockrell, John R., Jr., to Kay Chemical Company. Soil release agent and method to facilitate the cleaning of ovens used for cooking. 4,877,691, Cl. 428-688.000.

Cody, George D.; Elzinga, Eugene R., Jr.; Callegari, Andrew J.; and Cohen, Roger W., to Exxon Research and Engineering Company. Passive acoustic power spectra to monitor and control processing. 4,877,488, Cl. 201-1.000.

Coffey, Carl E.; and Coffey, Darlene M. Glove with easy safe removal means. 4,876,747, Cl. 2-168.000.

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Coffey, Carl E.; and Coffey, Darlene M., 4,876,747, Cl. 2-168.000.

Cohen, Noal, to Hoffmann-La Roche Inc. Vitamin E intermediate. 4,877,890, Cl. 549-407.000.

Cohen, Richard K. Decorative faucet handle mounting apparatus. 4,876,766, Cl. 16-114.00R.

Cohen, Roger W.: *See*—
Cody, George D.; Elzinga, Eugene R., Jr.; Callegari, Andrew J.; and Cohen, Roger W., 4,877,488, Cl. 201-1.000.

Cohen, Sara: *See*—
Velan, Baruch; Cohen, Sara; Grosfeld, Haim; and Shafferman, Avigdor, 4,877,865, Cl. 530-351.000.

Cok, Steven P., to John Fluke Mfg. Co., Inc. N-PI phase/frequency detector. 4,878,231, Cl. 375-80.000.

Colgate-Palmolive Company: *See*—
Lai, Kuo-Yann, 4,877,546, Cl. 252-174.170.
Rounds, Rhyta S., 4,878,150, Cl. 361-311.000.

Colin, Michel: *See*—
Shroot, Braham; Hensby, Christopher; Maignan, Jean; Lang, Gerard; Restle, Serge; and Colin, Michel, 4,877,789, Cl. 514-255.000.

Collins & Aikman Corporation: *See*—
Endrenyi, Frank, Jr.; and Hankins, Larry W., 4,877,669, Cl. 428-88.000.

Collins, Earl R., Jr., to United States of America, Administrator, National Aeronautics and Space Administration. Convergent strand array liquid pumping system. 4,877,082, Cl. 165-104.260.

Colombo, Alessandro, to SGS- Thomson Microelectronics s.r.l. Power supply gradually developing an output voltage when switched on. 4,878,164, Cl. 363-49.000.

Colterjohn, Walter L., Jr. Optical radiation source. 4,877,991, Cl. 313-22.000.

Colwell, Robert A.; and Stone, Thomas W., to MagneTek Universal Electric. Electric motor and pump mounting bracket assembly and method of making. 4,877,984, Cl. 310-66.000.

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McQuoid, Bryan K.; Charlson, Earl J.; and Graham, Huber, 4,878,226, Cl. 374-166.000.

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Comfort, Benjamin J.: *See*—
Atkins, Judy M.; Comfort, Benjamin J.; and Liebelt, Ralph A., 4,877,034, Cl. 128-664.000.

Comte, Gilles; and Viode, Andre, to Societe Anonymes dite: SOGELERG; and Societe Nouvelle Auxim. Digital valve. 4,877,056, Cl. 137-599.000.

Conair Corporation: *See*—
Raab, John J., 4,877,942, Cl. 219-225.000.

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Bragaw, Chester G., Jr.; Concannon, Thomas P.; and Davis, Robert F., 4,877,683, Cl. 428-421.000.

Conley, Larry R. High speed discrete wire pin panel assembly with embedded capacitors. 4,878,155, Cl. 361-401.000.

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Byrd, William A.; Oman, Joel E.; and Connors, William, 4,877,985, Cl. 310-86.000.

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Shreiner, Thomas A., 4,877,672, Cl. 428-156.000.

Conti-Ramsden, John N.; Powell, Richard L.; Young, Brian D.; Farrar, Jeffrey; and Brown, Debra K., to Imperial Chemical Industries PLC. Fluorocopolymer compositions. 4,877,839, Cl. 525-200.000.

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Continental Can Company, Inc.: *See*—
Walter, John, 4,877,054, Cl. 137-560.000.

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Nay, Daniel L.; Korn, Darryl K.; and Ralph, John T., 4,878,197, Cl. 364-900.000.

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Kalal, Theodore T.; and Kowitch, Richard, 4,878,143, Cl. 361-94.000.

Cooper, William J.: *See*—
Franklin, Harlow; Cooper, William J.; and Deschenes, Charles L., 4,877,172, Cl. 227-67.000.

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Bruggeman, Rudyard J.; and Carscallen, Gregory A., 4,876,875, Cl. 72-199.000.

Cope, Dennis. Inflatable bag. 4,877,334, Cl. 383-3.000.

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Caillat, Jean-Luc M.; Weatherston, Roger C.; and Bush, James W., 4,877,382, Cl. 418-55.000.

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Tomei, L. David; Cornhill, Fred; Jagadeesh, Jogikal; and Boninger, Michael, 4,877,966, Cl. 250-458.100.

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Kar, Gitimoy, 4,877,306, Cl. 350-96.330.

Corning Incorporated: *See*—
Bhagavatula, Venkata A., 4,877,304, Cl. 350-96.290.
Frost, Rodney I., 4,877,766, Cl. 502-439.000.
Newhouse, Mark A.; Nolan, Daniel A.; and Weidman, David L., 4,877,300, Cl. 350-96.150.

Costall, Brenda, to National Research Development Corporation. Antipsychotic compositions containing dioxopiperidine derivatives. 4,877,800, Cl. 514-328.000.

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Cottle, Wilbur W.: *See*—
Gibbons, Robert C.; and Cottle, Wilbur W., 4,877,317, Cl. 350-559.000.

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Mercer, William C.; Coughlin, Peter K.; McLeod, Donald, Jr.; and Flanigen, Edith M., 4,876,890, Cl. 73-336.500.

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Cowell, Mark J.; Ladd, Kevin; and Carter, Philip S., Jr., to Metcal, Inc. Self regulating heater. 4,877,944, Cl. 219-548.000.

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Crace, Robert J., 4,877,417, Cl. 44-535.000.

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Craven, Tyson S.; and Choriyammakal, Pushpa M., to Dayton-Granger, Inc. Global position satellite antenna. 4,878,062, Cl. 343-872.000.
Creagh, Linda T.; Fulton, Steven F.; Hoisington, Paul A.; Paulson, Bruce A.; Schaffer, Robert R.; and Spehrley, Charles W., Jr., to Spectra, Inc. Hot melt ink transparency. 4,877,676, Cl. 428-204.000.
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Croce, Carlo P.: *See*—
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Kirjanov, Alexander S.; and Herlant, Michel A., 4,877,538, Cl. 252-8.700.
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Cryodynamics, Inc.: *See*—
Malaker, Stephen F., 4,877,434, Cl. 62-6.000.
Csanyi, Istvan: *See*—
Grimm, Istvan; Stenczinger, Sandor; Bolla, Istvan; and Csanyi, Istvan, 4,876,790, Cl. 29-603.000.
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Cubic Western Data Corporation: *See*—
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Cuevas, Jess, to Talley Automotive Products, Inc. Aspirating/venting air bag module assembly. 4,877,264, Cl. 280-731.000.
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McGovern, Terrence P.; Flath, Robert A.; and Cunningham, Roy T., 4,877,607, Cl. 424-84.000.
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Petrucci, Raymond M.; Taylor, Bruce G.; Giordano, Edward C.; Padiall, James M.; and Palmer, Carl, 4,877,521, Cl. 210-171.000.
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CuQ, Jean: *See*—
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Cyanide Destruct Systems, Inc.: *See*—
Robey, Herbert L., 4,877,519, Cl. 210-86.000.
Cypress Semiconductor: *See*—
Platt, Paul E., 4,877,978, Cl. 307-473.000.
D B Industries, Inc.: *See*—
Wolner, J. Thomas, 4,877,110, Cl. 182-232.000.
D.L. Auld Company, The: *See*—
Yaver, Perry N., 4,877,657, Cl. 428-31.000.
Da-Tel Research Company, Incorporated: *See*—
Gilbert, Everett A., 4,878,241, Cl. 379-106.000.
Daicel Chemical Industries, Ltd.: *See*—
Murabayashi, Katsuyoshi; and Mitani, Katsuyoshi, 4,877,816, Cl. 521-92.000.
Namikoshi, Hajime; and Goto, Tatsuo, 4,877,617, Cl. 424-409.000.
Daido Metal Company: *See*—
Muto, Takashi, 4,877,696, Cl. 428-645.000.
Daikin Industries, Ltd.: *See*—
Tamaru, Sinji; Kubo, Motonobu; and Kashiwagi, Masato, 4,877,859, Cl. 528-129.000.
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Alt, Claus-Christian; Gobel, Rudolf; Koch, Heinz; Niechoj, Wolfgang; Grossmann, Theodor; and Deffner, Felix, 4,877,258, Cl. 277-212.0FB.
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Schuster, Hans-Dieter; Noller, Christoph; Wollenraupt, Gottfried; Kreeb, Reiner; and Huss, Roland, 4,877,339, Cl. 384-218.000.
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Abthoff, Joerg; Schuster, Hans-Dieter; Langer, Hans-Joachim; Strohmer, Erwin; Gabler, Rolf; and Schulte, Roland, 4,876,852, Cl. 60-275.000.
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Dandliker, Walter B.; Barr, Howard S.; Katzenstein, Henry S.; and Watson, Keith R., to Diatron Corporation. Fluorometer. 4,877,965, Cl. 250-458.100.
Danielson, Arvin D., and Durbin, Dennis A., to Norand Corporation. Hand-held instant bar code reader system with automated focus based on distance measurements. 4,877,949, Cl. 235-462.000.
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Shirtum, Robert P.; and Darby, Elaine B., 4,877,857, Cl. 528-95.000.
Darley, Henry M.; Gill, Michael C.; Earl, Dale C.; Ngo, Dinh T.; Wang, Paul C.; Hipona, Maria B. L.; and Dodrill, Jim, to Texas Instruments Incorporated. Floating point/integer processor with divide and square root functions. 4,878,190, Cl. 364-752.000.
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Goekjian, Kenneth S., 4,878,173, Cl. 364-200.000.
Datamain 2000, Inc.: *See*—
Baucom, Walter H., 4,877,164, Cl. 224-42.440.
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Sparling, Robert D., II; and Vachon, Gerard L., 4,877,652, Cl. 427-264.000.
Davies, Roy V., to Boots Company, PLC, The. Thieno[3,2-b]pyridine-6-carboxamide compounds useful in treating hypertension. 4,877,793, Cl. 514-301.000.
Davis, Cecil J.: *See*—
York, Rudy L.; Luttmer, Joseph D.; Smith, Patricia B.; and Davis, Cecil J., 4,877,757, Cl. 437-235.000.
Davis, Leo W., to Liquid Spring Investors, Ltd. Fluid suspension spring and dampener for vehicle suspension system. 4,877,222, Cl. 267-64.130.
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Clarke, Peter G.; Mirwaldt, Ulrich; and Wandel, Dietmar, 4,877,572, Cl. 264-555.000.
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DeBraal, Stanley J.; and Nickles, Daniel R., to Deere & Company. Adjustable height vehicle roll-over bar. 4,877,265, Cl. 280-756.000.
De Brock, Raoul, to Akzo NV. Arrangement for applying surface pressure to continuously moving workpiece webs. 4,877,392, Cl. 425-371.000.
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De Filippi, Quinto. Refuse vehicle. 4,877,366, Cl. 414-517.000.
DeForrest, William, Sr. Protected sliding bolt locking structure. 4,877,275, Cl. 292-148.000.
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DeRosa, Angelo; and McKenna, Kevin D., to Sterling Plastic & Rubber Products, Inc. Elastomeric insert for containing lashing. 4,877,361, Cl. 410-112.000.
Derving, Jackie, to Tetra Pak International AB. Valve unit. 4,877,160, Cl. 222-494.000.
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Desjardins, Rene A., to Boeing Company, The. Drive shaft and rotor hub for helicopter flexible rotor system. 4,877,375, Cl. 416-134.00A.
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Deutsche Babcock Werke Aktiengesellschaft: *See—*
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DiFiore, Dante. Foundation waterproofing method. 4,877,350, Cl. 405-38.000.
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Kaufman, Charles W.; Kempf, Mark F.; and Hutchison, Jerry D., 4,878,219, Cl. 370-97.000.
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Director General Agency of Industrial Science and Technology: *See—*
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Ditzler, Lee C.; Lemberger, Ronald F.; and Slezak, Cynthia L., to Trineos. Method and apparatus for generating ozone by corona discharge. 4,877,588, Cl. 422-186.190.
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Doane, Leland R. Device for supporting objects on a vehicle door. 4,877,284, Cl. 296-153.000.
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Dolomitwerke GmbH: *See—*
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Dow Chemical Company, The: *See—*
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Dowell Australia Limited: *See—*
Sassella, Christopher D., 4,876,864, Cl. 70-89.000.
Sassella, Christopher D.; Whitney, John R.; and McGeehan, Harold K., 4,877,227, Cl. 269-43.000.
Dowell, James S.: *See—*
Hinds, Robert B.; Hutchinson, Charles B., Jr.; and Dowell, James S., 4,877,386, Cl. 425-110.000.
Downey, John H. Dynamic hair grooming appliance. 4,877,042, Cl. 132-212.000.

Draegerwerk Aktiengesell Schaft: *See—*
Sauerbaum, Thomas; and Kahning, Stefan, 4,877,329, Cl. 374-28.000.
Draf, Rolf: *See—*
Von Jordan, Wenzel; Draf, Rolf; Grone, Dieter; and Sauer, Harald, 4,877,598, Cl. 423-640.000.
Drejer, Jorgen; and Jakobsen, Palle, to A/S Ferrosan. Method of treating calcium overload in brain cells of mammals. 4,877,799, Cl. 514-317.000.
Dresser-Rand Company: *See—*
Bandukwalla, Phiroze, 4,877,369, Cl. 415-148.000.
Bandukwalla, Phiroze, 4,877,373, Cl. 415-208.400.
Dresser U.K. Limited, A British Company: *See—*
Smith, Charles G.; and Cottrell, Terence B. F., 4,877,427, Cl. 55-136.000.
Drews, Wolf-Dietrich; Van Der Linden, Klaus; Ruttel, Martin; and Friedrich, Jurgen, to Siemens Aktiengesellschaft. Ultrasonic pocket atomizer. 4,877,989, Cl. 310-323.000.
Driggers, Roberts H. Method for installing and removing a fireplace insert. 4,876,785, Cl. 29-426.300.
Droke, A. Farrel: *See—*
Fagan, John E.; and Droke, A. Farrel, 4,876,934, Cl. 83-879.000.
Drost, Stephan: *See—*
Schmidt, Helmut; Hutter, Frank; Haas, Karl-Heinz; Obermeier, Ernst; Steger, Ulrich; Endres, Hanns-Erik; and Drost, Stephan, 4,878,015, Cl. 324-71.500.
Droste, Timothy A.: *See—*
Crandall, Scott R.; Droste, Timothy A.; and Rosen, Stanley D., 4,876,923, Cl. 74-732.000.
Du Pont Canada Inc.: *See—*
Chu, Kenneth C., 4,877,840, Cl. 525-240.000.
Duffour, Henri; Martin, Serge; and Studer, Ernst, to BBC Brown Boveri Ltd. Release mechanism for a high speed circuit breaker. 4,877,928, Cl. 200-144.00R.
Duffy, James J., to Ford Motor Company. Electronically controlled variable assist power steering system. 4,877,099, Cl. 180-142.000.
Duke University: *See—*
Wilson, James F.; George, Rhett T., Jr.; and Chen, Zhenhai, 4,876,944, Cl. 91-35.000.
Duley, Walter W.; and Kinsman, Grant. Means of enhancing laser processing efficiency of metals. 4,877,939, Cl. 219-121.760.
Dunlop Limited a British Company: *See—*
Shaw, Michael, 4,877,252, Cl. 273-232.000.
Dunlop, Vance A.: *See—*
Eggiman, J. Michael; and Dunlop, Vance A., 4,878,042, Cl. 340-439.000.
Dupont, Andrea C.: *See—*
Rzeszotarski, Waclaw J.; Guzewska, Maria E.; Carter, John P.; Adams, Theodore C.; Dupont, Andrea C.; and Kaiser, Carl, 4,877,779, Cl. 514-63.000.
du Pont, Benjamin F.; and Sukeforth, Carl J., to Benjamin F. Du Pont. Stackable blocks. 4,877,407, Cl. 434-302.000.
Du Pont de Nemours, E. I., and Company: *See—*
Bragaw, Chester G., Jr.; Concannon, Thomas P.; and Davis, Robert F., 4,877,683, Cl. 428-421.000.
Brittelli, David R., 4,877,892, Cl. 549-552.000.
Buckmaster, Marlin D.; and Randa, Stuart K., 4,877,815, Cl. 521-85.000.
Christensen, Joel R.; Cuomo, John; and Levitt, George, 4,877,440, Cl. 71-90.000.
Hillemann, Craig L., 4,877,442, Cl. 71-92.000.
Ling, Lorraine B.; and Ng, Thomas K., 4,877,731, Cl. 435-142.000.
Merchant, Abid N.; Gorski, Robert A.; and Burke, Kenneth C., 4,877,545, Cl. 252-171.000.
Scopelianos, Angelo G., 4,877,775, Cl. 514-41.000.
Yau, Wallace W., 4,876,882, Cl. 73-55.000.
Durant, Michael B.: *See—*
Kuhn, Lawrence H.; and Durant, Michael B., 4,877,294, Cl. 303-9.000.
Durbin, Dennis A.: *See—*
Danielson, Arvin D.; and Durbin, Dennis A., 4,877,949, Cl. 235-462.000.
Dutton, Drew J.: *See—*
Johnson, William M.; Olson, Timothy A.; Dutton, Drew J.; Lee, Sherman; and Stoenner, David W., 4,878,166, Cl. 364-200.000.
Dutzmann, Stefan: *See—*
Elbe, Hans-Ludwig; Dutzmann, Stefan; and Reinecke, Paul, 4,877,446, Cl. 71-92.000.
Dyckerhoff & Widmann Aktiengesellschaft: *See—*
Aicher, Max; Jungwirth, Dieter; Klein, Hans-Wilhelm; and Russwurm, Dieter, 4,877,463, Cl. 148-12.00B.
Dyer, Gerald P., to United Technologies Corporation. Densimeter. 4,876,880, Cl. 73-32.00R.
Dziobek, Frank; and Mollenhoff, Horst, to Deutsche Babcock Werke Aktiengesellschaft. Method and device for cooling flue dust. 4,877,423, Cl. 55-27.000.
E. R. Squibb and Sons, Inc.: *See—*
Steer, Peter L.; and Steer, Graham E., 4,876,788, Cl. 29-508.000.
Earl, Dale C.: *See—*
Darley, Henry M.; Gill, Michael C.; Earl, Dale C.; Ngo, Dinh T.; Wang, Paul C.; Hipona, Maria B. L.; and Dodrill, Jim, 4,878,190, Cl. 364-752.000.
Easler, Timothy E.: *See—*
Fee, Darrell C.; Poeppel, Roger B.; Easler, Timothy E.; and Dees, Dennis W., 4,877,506, Cl. 204-242.000.
Eastern Company, The: *See—*
Pastva, John V., 4,877,276, Cl. 292-218.000.
Eastman Christensen Company: *See—*
Tibbitts, Gordon A., 4,877,096, Cl. 175-410.000.
Eastman Kodak Company: *See—*
Cannon, James W., 4,878,075, Cl. 354-173.100.
Chen, Chung Y.; Riecke, Edgar E.; Harbison, Kenneth G.; and Chapman, Derek D., 4,877,724, Cl. 430-621.000.
Devaney, Mark J., Jr.; and Wannenwetsch, Edward H., 4,877,586, Cl. 422-101.000.
Diehl, Donald R.; and Reed, Ralph C., 4,877,721, Cl. 430-522.000.
Fagerburg, David R.; Watkins, Joseph J.; and Lawrence, Paul B., 4,877,851, Cl. 525-537.000.
Fagerburg, David R.; and Watkins, Joseph J., 4,877,862, Cl. 528-481.000.
Glocker, David A.; Hatwar, Tukaram K.; McIntire, Gregory Lynn; Rao, Srinivas T.; and Stinson, Douglas G., 4,877,690, Cl. 428-627.000.
Guslits, Vladimir S.; and Weitzel, Richard A., 4,878,089, Cl. 355-253.000.
Katerberg, James A., 4,878,063, Cl. 346-1.100.
Katerberg, James A.; Wint, Robert L.; and Lewis, Richard A., 4,878,064, Cl. 346-75.000.
Lawrence, David J., 4,878,222, Cl. 372-48.000.
Mickle, Donald A. G.; and Wu, Tai-Wing, 4,877,810, Cl. 514-456.000.
Muszak, Martin F., 4,876,926, Cl. 81-3.200.
Yamazaki, Shunpei, 4,878,097, Cl. 357-58.000.
Young, Ralph H.; and May, John W., 4,877,699, Cl. 430-54.000.
Eaton Corporation: *See—*
Fletcher, Melvern W.; and Wylie, David G., 4,876,924, Cl. 74-745.000.
Oltean, Jerry M.; and Goodwin, Paul E., 4,877,048, Cl. 137-225.000.
Ebbers, Timothy J.: *See—*
Aranda, Michael A.; Ebbers, Timothy J.; Iida, Yoshio; Lindgren, Terence W.; and Robertson, Taggart H., 4,878,182, Cl. 364-518.000.
Ebeling, Wolfgang, to Turmag Turbo-Maschinen-Ag Nusse & Grafer. Rock drilling machine, especially for underground mining. 4,877,094, Cl. 175-170.000.
Eberhardt, Thomas E. Apparatus for treating bodies of water. 4,877,524, Cl. 210-242.100.
Ebert, George W., to Home Fashions, Inc. Vertical coextruded pearlescent louver for vertical blinds. 4,877,077, Cl. 160-236.000.
ECIA - Equipements Et Composants Pour L'Industrie Automobile: *See—*
Escaravage, Gerard, 4,877,287, Cl. 297-417.000.
Eckel, Hans-Joachim; and Warych, Hans, to Signode System GmbH. Edge protector. 4,877,673, Cl. 428-172.000.
Ecoffey, Olivier; Mueller, Theodore; and Sigg, Hans, to Meseltron S.A. Pneumatic ring gauge. 4,876,883, Cl. 73-37.500.
Edmunds, Cyril G., to Xerox Corporation. Dual roll cleaning apparatus for charge retentive surface. 4,878,093, Cl. 355-296.000.
Eduard Kusters Maschinenfabrik GmbH & Co. KG: *See—*
Schrors, Gunter; Brendel, Bernhard; and Hartmann, Werner, 4,877,331, Cl. 374-153.000.
Edwards, Bruce W.: *See—*
Edwards, D. Brandon; Edwards, Bruce W.; Howard, Ian D.; and Ives, Donald H., 4,877,316, Cl. 350-537.000.
Edwards, D. Brandon; Edwards, Bruce W.; Howard, Ian D.; and Ives, Donald H., to Edwards Optical Corporation. Telemicroscopic apparatus for sighting and bi-level viewing. 4,877,316, Cl. 350-537.000.
Edwards Optical Corporation: *See—*
Edwards, D. Brandon; Edwards, Bruce W.; Howard, Ian D.; and Ives, Donald H., 4,877,316, Cl. 350-537.000.
Egerton, Gary W.: *See—*
Martin, Gregory C.; and Egerton, Gary W., 4,876,885, Cl. 73-129.000.
Eggiman, J. Michael; and Dunlop, Vance A., to Eggiman, J. Michael. Apparatus for flashing vehicle lights to warn of engine stall. 4,878,042, Cl. 340-439.000.
Eichenberger, Peter, to Ford Motor Company. Dual range infinitely variable transmission. 4,876,920, Cl. 74-689.000.
Eickmann, Karl. Combustion engine for solid block fuel. 4,876,850, Cl. 60-39.464.
Eisman, Larry, to Dopaco, Inc. Paperboard foldable carton. 4,877,178, Cl. 229-114.000.
Ekstrom, Philip A.: *See—*
Fralick, Richard D.; and Ekstrom, Philip A., 4,876,818, Cl. 43-7.000.
Elantec: *See—*
Gross, William H.; and Cecil, James B., 4,878,034, Cl. 330-298.000.
Elbe, Hans-Ludwig; Dutzmann, Stefan; and Reinecke, Paul, to Bayer Aktiengesellschaft. Pesticides based on pyrimidine derivatives. 4,877,446, Cl. 71-92.000.
Electicite de France (Service National): *See—*
Donati, Jean R.; Guttmann, Daniele; Rouillon, Yves; Paul, Pierre S.; and Zacharie, Guy, 4,877,465, Cl. 148-428.000.
Electro-Plasma, Inc.: *See—*
Muehlberger, Erich; and Sickinger, Albert, 4,877,640, Cl. 427-34.000.
Elf France: *See—*
Trema, Daniel, 4,877,097, Cl. 180-357.000.
Elion, Jonathan L., to University of Kentucky Research Foundation. Dynamic coronary roadmapping. 4,878,115, Cl. 358-111.000.

Elliott, Arthur J.: *See—*
Lovey, Raymond G.; and Elliott, Arthur J., 4,877,801, Cl. 548-336.000.

Ellisor, Milton W., Jr.: *See—*
Snow, Richard K.; and Ellisor, Milton W., Jr., 4,876,896, Cl. 73-827.000.

Elscint Ltd.: *See—*
Granot, Joseph, 4,878,021, Cl. 324-309.000.

Eltech Systems Corporation: *See—*
Barnes, Albert L.; Clere, Thomas M.; Abbaschian, Gholamreza J.; and Wheeler, Douglas J., 4,876,941, Cl. 89-36.020.
Solomon, Frank; Genodman, Yury; and Irizarry, Jaime, 4,877,694, Cl. 429-27.000.

Eltek, S.p.A.: *See—*
Fornasari, Paolo, 4,877,049, Cl. 137-312.000.

Elzinga, Eugene R., Jr.: *See—*
Cody, George D.; Elzinga, Eugene R., Jr.; Callegari, Andrew J.; and Cohen, Roger W., 4,877,488, Cl. 201-1.000.

Emmons, William D.; and Winkle, Mark R., to Rohm and Haas Company. Electrophoretically depositable photosensitive polymer composition. 4,877,818, Cl. 522-26.000.

Emori, Yasuyoshi; Ohsaki, Hiroshi; and Nomura, Ikuo, to Jidosha Kiki Co., Ltd. Hydraulic reaction force apparatus for power steering system. 4,877,100, Cl. 180-143.000.

Emtek Health Care Systems: *See—*
Norden-Paul, Ronald E.; Fein, Murray A.; and Stewart, Sandra L., 4,878,175, Cl. 364-413.010.

Enami, Yasushi, to Bridgestone Corporation. Apparatus for adjusting a water level of a lock. 4,877,351, Cl. 405-86.000.

Endoh, Eiji: *See—*
Morimoto, Takeshi; and Endoh, Eiji, 4,877,508, Cl. 204-290.00R.

Endrenyi, Frank, Jr.; and Hankins, Larry W., to Collins & Aikman Corporation. Tufted pile fabric. 4,877,669, Cl. 428-88.000.

Endres, Hanns-Erik: *See—*
Schmidt, Helmut; Hutter, Frank; Haas, Karl-Heinz; Obermeier, Ernst; Steger, Ulrich; Endres, Hanns-Erik; and Drost, Stephan, 4,878,015, Cl. 324-71.500.

Energy Conservation Partnership, Ltd.: *See—*
Johnson, Arthur F., 4,876,986, Cl. 122-20.00B.

Energy Research Corporation: *See—*
Baker, Bernard S., 4,877,693, Cl. 429-19.000.

Engelhardt, Fritz; Hintermeier, Karl; Muller, Manfred; Munch, Norbert; and Wagener, Hans, to Cassella Aktiengesellschaft. Methylolated and optionally etherified urethanes containing fluoroalkyl ligands. 4,877,540, Cl. 252-8.750.

Engelstoft, Mogens: *See—*
Biere, Helmut; Huth, Andreas; Rahtz, Dieter; Schmiechen, Ralph; Seidelmann, Dieter; Stephens, David N.; Engelstoft, Mogens; and Hansen, John B., 4,877,792, Cl. 514-292.000.

Ennghillis, Pavlina: *See—*
Watkins, Daniel; Wong, Jimmy; and Ennghillis, Pavlina, 4,878,174, Cl. 364-200.000.

Enomoto, Masayuki; Nagano, Eiki; Haga, Toru; Morita, Kouichi; and Sato, Ryo, to Sumitomo Chemical Company, Limited. Tetrahydroindazolyl-benzoxazines and use. 4,877,444, Cl. 71-92.000.

Entreprise Gagneraud Pere & Fils: *See—*
Roussel, Michel; and Baffreau, Daniel, 4,877,452, Cl. 106-97.000.

Epperly, William R.; O'Leary, John H.; Sullivan, James C.; and Sprague, Barry N., to Fuel Tech, Inc. Process for nitrogen oxides reduction with minimization of the production of other pollutants. 4,877,590, Cl. 423-235.000.

Epperly, William R.; and Sullivan, James C., to Fuel Tech, Inc. Process for the reduction of nitrogen oxides in an effluent using sugar. 4,877,591, Cl. 423-235.000.

Ermel, Bernard A.: *See—*
Lanigan Jr., John J.; Glickman, Myron; and Ermel, Bernard A., 4,877,365, Cl. 414-459.000.

Erosion Protection Devices, Incorporated: *See—*
Greene, Richard M., 4,877,349, Cl. 405-27.000.

Escaravage, Gerard, to ECIA - Equipements Et Composants Pour L'Industrie Automobile. Device for adjusting the position of an armrest of an automobile vehicle seat. 4,877,287, Cl. 297-417.000.

Eschmann, Friedrich; and Streuber, Christian, to Didier-Werke AG. Hot blast stove installation. 4,877,013, Cl. 126-110.000.

Esser, Leonard J. M.: *See—*
Bakker, Jacobus G. C.; and Esser, Leonard J. M., 4,878,102, Cl. 357-24.000.

Esser, Wolfgang; and Jung, Peter, to Nixdorf Computer AG. Voltage source having preset values for source voltage and internal resistance. 4,878,009, Cl. 323-275.000.

Estavoyer, Jacques: *See—*
Cherbuy, Bernard; and Estavoyer, Jacques, 4,877,341, Cl. 400-119.000.

Eszakmagyarorszagi Vegyimuvek: *See—*
Neu Jozsef; Csatlos, Imre; Varga, Andras; Suranyi, Robert; Ilovai, Zoltan; Gaal, Sandor; Karsai, Jozsef; Sebestyen, Endre; Gardi, Eva; Siki, Karoly; Toth, Istvan; Gal, Guszt/e,acu/a/ v; Dombay, Zsolt; Grega nee Toth, Mrs. Erzsebet; Pavliscsak, Csaba; Tarpai, Gyula; Bonnyay, Peter; and Santha, Pal, 4,877,893, Cl. 558-86.000.

Etani, Tadao: *See—*
Honda, Sumio; Ogata, Taizo; and Etani, Tadao, 4,876,839, Cl. 53-137.000.

Etat Francais as represented by the Delegue general pour l'armement: *See—*
Dasse, Gerard, 4,877,466, Cl. 149-108.600.

Etat Francais Represente par le Ministre des PTT: *See—*
Thioulouse, Pascal; and Solomon, Ionel, 4,877,995, Cl. 313-507.000.

Ethyl Corporation: *See—*
Broemmelsiek, H. Eugene; Lee, Raymond; and Lanier, Carroll W., 4,877,563, Cl. 264-26.000.
Gatto, Vincent J., 4,877,902, Cl. 568-23.000.

Eto, Kazumi: *See—*
Tanaka, Hiroshi; Murata, Yasukiyo; and Eto, Kazumi, 4,876,861, Cl. 62-279.000.

Eto, Naonobu: *See—*
Sakaki, Mamoru; Arai, Ryuichi; Akiya, Takashi; Toganoh, Shigeo; Higuma, Masahiko; Eto, Naonobu; Mouri, Hidemasa; Tobita, Michiaki; Ishida, Masahiko; and Kono, Shunzo, 4,877,680, Cl. 428-332.000.

Etter, Hans: *See—*
Hauri, Bernhard; and Etter, Hans, 4,877,324, Cl. 356-251.000.

Evans, Samuel, to Ciba-Geigy Corporation. Sulfur-containing compounds as antioxidants for lubricants and elastomers. 4,877,824, Cl. 524-83.000.

Ewart, Ron B. Photographic image data management system for a visual system. 4,878,183, Cl. 364-521.000.

Exxon Research and Engineering Company: *See—*
Chung, Tze-Chiang, 4,877,846, Cl. 525-369.000.
Cody, George D.; Elzinga, Eugene R., Jr.; Callegari, Andrew J.; and Cohen, Roger W., 4,877,488, Cl. 201-1.000.
Goetsch, Duane A.; and Say, Geoffrey R., 4,877,550, Cl. 252-373.000.
Wisotsky, Max J.; and Metro, Stephen J., 4,877,541, Cl. 252-47.500.

Eyedentify, Inc.: *See—*
Hill, Robert V., 4,877,322, Cl. 351-221.000.

Faber, Thomas J.: *See—*
Guenther, Kenneth L.; Rabindran, Karavattuveetil G.; Faber, Thomas J.; and Abrams, Jack S., 4,877,346, Cl. 400-624.000.

Facit Aktiebolag: *See—*
Stenudd, Sven G. V., 4,877,342, Cl. 400-121.000.

Fagan, John E.; and Droke, A. Farrel, to Burford Corp. Computerized bread splitter. 4,876,934, Cl. 83-879.000.

Fagerburg, David R.; Watkins, Joseph J.; and Lawrence, Paul B., to Eastman Kodak Company. Blends of copoly(arylene sulfide) and poly(arylene sulfide). 4,877,851, Cl. 525-537.000.

Fagerburg, David R.; and Watkins, Joseph J., to Eastman Kodak Company. Solid state polymerization process for increasing the molecular weight of colpoly(arylene sulfide). 4,877,862, Cl. 528-481.000.

Fahey, William F.: *See—*
Zetlmeisl, Michael J.; and Fahey, William F., 4,877,578, Cl. 422-14.000.

Fairchild, Paul W.; Claney, Jim L.; Fields, William G.; Bishop, Louis, Jr.; and Fly, Mark W., to Thermo-Aire Systems, Inc. Low temperature air induction diffuser. 4,876,949, Cl. 98-40.100.

Falconbridge Limited: *See—*
Bulatovic, Srdjan; and Jessup, Tim M., 4,877,517, Cl. 209-167.000.

Falconer, Ian: *See—*
Bible, Matthew; Lesage, Marc; and Falconer, Ian, 4,876,886, Cl. 73-151.500.

Falgat, Francis: *See—*
Barbier, Pascal; Falgat, Francis; and Sorel, Alain, 4,878,060, Cl. 343-778.000.

Falicoff, Waqidi; Delano, Richard; and Raseman, Chad J. Light transmitting or reflective sheet responsive to temperature variations. 4,877,675, Cl. 428-204.000.

Faller, Bernd: *See—*
Ackermann, Frank; Wollermann-Windgasse, Reinhard; and Faller, Bernd, 4,878,227, Cl. 372-107.000.

Falloon, David R. Tossing game. 4,877,256, Cl. 273-400.000.

Fanselow, Dan L.: *See—*
Ko, Su-sen; and Fanselow, Dan L., 4,877,037, Cl. 128-756.000.

Fanuc Ltd.: *See—*
Aso, Toshiyuki; and Ishibashi, Tamotsu, 4,877,935, Cl. 219-69.120.
Inaba, Yoshiharu; and Tokunaga, Shigeo, 4,877,388, Cl. 425-150.000.
Kiya, Nobuyuki; and Maeda, Kimio, 4,878,171, Cl. 364-474.290.
Matsumura, Teruyuki, 4,878,172, Cl. 364-191.000.
Torii, Nobutoshi; Mizuno, Hitoshi; and Iwasaki, Kyoji, 4,877,973, Cl. 307-147.000.

Farah, Victor. Device for carrying bags, particularly refuse bags. 4,877,207, Cl. 248-97.000.

Farona, Michael F.; and Srinivasan, Ramji, to University of Akron. Method of polymerizing α,ω-diynes. 4,877,917, Cl. 585-416.000.

Farraj, Hefetz. Amusement device with playing pieces rearrangable in slots. 4,877,248, Cl. 273-153.00S.

Farrar, Jeffrey: *See—*
Conti-Ramsden, John N.; Powell, Richard L.; Young, Brian D.; Farrar, Jeffrey; and Brown, Debra K., 4,877,839, Cl. 525-200.000.

Faust, Wayne. Putting device. 4,877,251, Cl. 273-194.00A.

Favro, Lawrence D.: *See—*
Thomas, Robert L.; Kuo, Pao-Kuang; and Favro, Lawrence D., 4,878,116, Cl. 358-160.000.

Fee, Darrell C.; Poeppel, Roger B.; Easler, Timothy E.; and Dees, Dennis W. Monolithic solid electrolyte oxygen pump. 4,877,506, Cl. 204-242.000.

Fein, Michael E., to Tencor Instruments. High brightness and viewed gas discharge lamp. 4,877,997, Cl. 313-634.000.

Fein, Michael E.: *See—*
Chadwick, Curt H.; Sholes, Robert R.; Greene, John D.; Tucker, Francis D., III; Fein, Michael E.; Jann, P. C.; Harvey, David J.; and Bell, William, 4,877,326, Cl. 356-394.000.

Fein, Murray A.: *See—*
Norden-Paul, Ronald E.; Fein, Murray A.; and Stewart, Sandra L., 4,878,175, Cl. 364-413.010.

Felix, Willi, to Jos. Hunkeler Ltd. Window letter. 4,877,177, Cl. 229-92.300.

Felt, George R.; Multhauf, Donna K.; and Wagle, Sudhakar S., to Rorer Pharmaceutical Corporation. Product-dispensing method and apparatus. 4,876,891, Cl. 73-426.000.

Feltz, Kevin L.; Richardson, Glenn A.; and Burrell, Jonathan C., to Allied-Signal Inc. Shut off/pressure regulating valve for turbine engine. 4,876,857, Cl. 60-734.000.

Ferber, Hubert P.: *See—*
Binder, Dieter; Rovensky, Franz; and Ferber, Hubert P., 4,877,809, Cl. 514-444.000.

Ferrant, Richard: *See—*
Bergemont, Albert; and Ferrant, Richard, 4,877,483, Cl. 156-653.000.

Ferry, David K.: *See—*
Bernstein, Gary; Ferry, David K.; and Liu, Wenping, 4,877,716, Cl. 430-309.000.

Festo KG: *See—*
Stoll, Kurt; and Muller, Lothar, 4,876,945, Cl. 92-5.00R.
Stoll, Kurt, 4,877,058, Cl. 137-625.480.

Fields, William G.: *See—*
Fairchild, Paul W.; Claney, Jim L.; Fields, William G.; Bishop, Louis, Jr.; and Fly, Mark W., 4,876,949, Cl. 98-40.100.

Fierkens, Richardus H. J.; and Pas, Ireneus J. T. M., to ASM Fico Tooling, b.v. Automatic continuously cycleable molding system. 4,877,387, Cl. 425-116.000.

Figgie International Inc.: *See—*
Rockerath, John L.; and Blust, Dale K., 4,877,655, Cl. 427-430.100.

Finduck S.r.l.: *See—*
Mannato, Pietro, 4,876,863, Cl. 70-64.000.

Finic, B.V.: *See—*
Ressi di Cervia, Arturo L., 4,877,358, Cl. 405-267.000.

Finley, John W.: *See—*
Klemann, Lawrence P.; Finley, John W.; and Scimone, Anthony, 4,877,871, Cl. 536-124.000.

Fiorenzano, Alintor, Jr. Sterilization system by means of high thermal gradient ducts. 4,877,990, Cl. 219-381.000.

Fiorina, Jean-Noel: *See—*
Moreau, Philippe; and Fiorina, Jean-Noel, 4,878,026, Cl. 324-547.000.

Firestone Tire & Rubber Company, The: *See—*
Siegenthaler, Karl J., 4,877,468, Cl. 156-111.000.

Fischer, Bernd F.: *See—*
Muchnik, Boris J.; and Fischer, Bernd F., 4,877,666, Cl. 428-64.000.

Fisher, David A., to STC PLC. Data transmission system. 4,878,232, Cl. 375-111.000.

Fisher, Roneldo L.: *See—*
Haeberle, Ronald M., Jr.; Smith, Gaylord D.; Weber, John H.; Fisher, Roneldo L.; Gaul, David J.; and Hinze, Jay W., 4,877,435, Cl. 65-1.000.

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Chevallier, Marc; and Froger, Guy, 4,877,272, Cl. 285-111.000.

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Morioka, Takayuki; Motoyama, Nobuyuki; Hoshikawa, Hiroshi; Takahashi, Takeo; Suzuki, Sizuo; Ishikawa, Tuyoshi; Toyoshi, Takanori; and Uede, Toshio, 4,877,558, Cl. 252-626.000.

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Koyano, Tetsuo; Sagi, Nobuo; Izumi, Tsugio; Fujita, Setsuya; Murata, Tadahiko; Hachiya, Iwao; and Mori, Hiroyuki, 4,877,636, Cl. 426-607.000.

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Takamura, Yoshiyuki, 4,876,840, Cl. 53-137.000.

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Higashi, Tatsuji; and Kita, Nobuyuki, 4,877,719, Cl. 430-326.000.
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Oda, Shohei; Seshimoto, Osamu; Sueyoshi, Tohru; and Amano, Hiroyuki, 4,877,582, Cl. 422-68.000.
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Fujisawa Pharmaceutical Co., Ltd.: *See*—
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Hanson, Gunnar J.; and Baran, John S., 4,877,785, Cl. 514-224.200.

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Shannon, William H., 4,877,236, Cl. 272-33.00R.

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Logan, James L., 4,877,279, Cl. 293-121.000.

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Clark, Steven C.; Ciarletta, Agnes B.; and Yang, Yu-Chung, 4,877,729, Cl. 435-68.000.
Wang, Elizabeth A.; Wozney, John M.; and Rosen, Vicki, 4,877,864, Cl. 530-324.000.

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Black, James L.; and Wason, Cameron B., 4,878,204, Cl. 367-53.000.

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Wilson, James F.; George, Rhett T., Jr.; and Chen, Zhenhai, 4,876,944, Cl. 91-35.000.

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Riou, Claude R.; and Gidon, Georges M., 4,877,686, Cl. 428-514.000.

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Gilbert, Everett A., to Da-Tel Research Company, Incorporated. Audio frequency interface for differential relays. 4,878,241, Cl. 379-106.000.

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Darley, Henry M.; Gill, Michael C.; Earl, Dale C.; Ngo, Dinh T.; Wang, Paul C.; Hipona, Maria B. L.; and Dodrill, Jim, 4,878,190, Cl. 364-752.000.

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Delbe, Emmanuel; Gillet, Francois; Serot, Etienne; Chifflet, Raymond; Allio, Roland; Jeantin, Philippe; Del Fabro, Gilbert; and Forella, Guy, 4,877,229, Cl. 271-2.000.

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Lamboy, Peter; Steigerwald, Franz; Zulauf, Karlheinz; and Ginnow-Markert, Harmut, 4,877,065, Cl. 141-18.000.

Giordano, David A.: *See*—
Neville, Donald G.; Giordano, David A.; and Hogan, Mark R., 4,877,106, Cl. 181-224.000.

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Petrucci, Raymond M.; Taylor, Bruce G.; Giordano, Edward C.; Padiali, James M.; and Palmer, Carl, 4,877,521, Cl. 210-171.000.

Givati, Izhak, to Shakbar Investments Ltd. Plastic clip particularly useful as a clothes pin. 4,876,771, Cl. 24-298.000.

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Naegeli, Peter, 4,877,904, Cl. 568-374.000.

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Walbridge, Van J.; and Donohue, R. Michael, 4,877,422, Cl. 55-20.000.

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Glanvall, Rune, to Stal Refrigeration AB. Control system for controlling the internal volume in a rotary compressor. 4,877,380, Cl. 417-310.000.

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Nitschke, David B., 4,877,437, Cl. 65-287.000.

Glenn, William E., to New York Institute of Technology. Light modulator video display apparatus. 4,878,122, Cl. 358-233.000.

Glickman, Myron: *See—*
Lanigan Jr., John J.; Glickman, Myron; and Ermel, Bernard A., 4,877,365, Cl. 414-459.000.
Glidden Company, The: *See—*
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Toman, Perry A., 4,877,838, Cl. 525-107.000.
Glocker, David A.; Hatwar, Tukaram K.; McIntire, Gregory Lynn; Rao, Srinivas T.; and Stinson, Douglas G., to Eastman Kodak Company. Magnetooptical recording element. 4,877,690, Cl. 428-627.000.
Gnyra, Bohdan: *See—*
Hudson, Tom J.; McIntyre, John; Tremblay, Pierre; Allaire, Claude; and Gnyra, Bohdan, 4,877,507, Cl. 204-243.00R.
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Alt, Claus-Christian; Gobel, Rudolf; Koch, Heinz; Niechoj, Wolfgang; Grossmann, Theodor; and Deffner, Felix, 4,877,258, Cl. 277-212.0FB.
Goble, Rowland H. Multipurpose structure. 4,877,237, Cl. 272-54.000.
Godfrey, Christopher A.: *See—*
Anthony, Vivienne M.; Clough, John M.; and Godfrey, Christopher A., 4,877,811, Cl. 514-522.000.
Goekjian, Kenneth S., to Data General Corporation. Controller burst multiplexor channel interface. 4,878,173, Cl. 364-200.000.
Goetsch, Duane A.; and Say, Geoffrey R., to Exxon Research and Engineering Company. Synthesis gas preparation and catalyst therefor. 4,877,550, Cl. 252-373.000.
Goggin, Philip E. Gas well discharge velocity dissipator. 4,877,084, Cl. 166-75.100.
Goldberg, Harris A.: *See—*
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Goldstein, Mark E.: *See—*
Govang, James A.; and Goldstein, Mark E., 4,877,137, Cl. 206-597.000.
Goleczka, Joseph; Harris, Walter; and Pringle, John, to Coal Industry (Patents) Limited. Briquette treatment process. 4,877,418, Cl. 44-600.000.
Golland, Wesley A.: *See—*
Baker, Joseph R.; Golland, Wesley A.; Mullens, Paul A.; and Trimble, Roger B., 4,877,179, Cl. 232-7.000.
Golob, Jurgen; and Franke, Wolfgang, to Braun Aktiengesellschaft. Shredding or slicing tool arrangement for cutting food material, in particular for food processors. 4,877,191, Cl. 241-92.000.
Gomes, Gary D., to Ampex Corporation. Precision device for soft clipping AC and DC signals. 4,877,981, Cl. 307-555.000.
Goodwin, Paul E.: *See—*
Oltean, Jerry M.; and Goodwin, Paul E., 4,877,048, Cl. 137-225.000.
Goodyear Tire & Rubber Company, The: *See—*
Fontaine, Jean F. L., 4,877,072, Cl. 152-209.00R.
Hopper, Roger J.; Shah, Niranjan V.; and Ryba, Steven M., 4,877,901, Cl. 564-82.000.
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Thise, Marie R.; and Reuter, Rene F., 4,877,073, Cl. 152-451.000.
Gordon Belt Scrapers, Inc.: *See—*
Gordon, James R., 4,877,125, Cl. 198-836.000.
Gordon, James R., to Gordon Belt Scrapers, Inc. Conveyor skirtboard mounting assembly. 4,877,125, Cl. 198-836.000.
Gordon, Robert L.: *See—*
Bernstein, Linda A.; and Gordon, Robert L., 4,877,932, Cl. 219-10.55E.
Gorski, Robert A.: *See—*
Merchant, Abid N.; Gorski, Robert A.; and Burke, Kenneth C., 4,877,545, Cl. 252-171.000.
Gosselink, Eugene P.: *See—*
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Goto, Hiroshi: *See—*
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Gotou, Makoto; and Matsubayashi, Shigeaki, to Matsushita Electric Industrial Co., Ltd. Control system with improved robustness to disturbances. 4,878,165, Cl. 364-158.000.
Gottesman, Jeffrey L.; Dempsky, Mark A.; Koch, Donald E.; and Rattan, Dev R., to Rockwell International Corporation. Channel redundancy in a digital loop carrier system. 4,878,048, Cl. 340-825.010.
Gould Inc.: *See—*
Lach, Lawrence E.; and Ohoka, Mikiharu, 4,877,976, Cl. 307-450.000.
Govang, James A.; and Goldstein, Mark E., to Stanley Works, The. Display package module for promotional display use. 4,877,137, Cl. 206-597.000.
Graham, Huber: *See—*
McQuoid, Bryan K.; Charlson, Earl J.; and Graham, Huber, 4,878,226, Cl. 374-166.000.
Graham, James H.: *See—*
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Gramet, Jean C.: *See—*
O'Nion, Geoffery; and Gramet, Jean C., 4,876,978, Cl. 114-230.000.
Granot, Joseph, to Elscint Ltd. Magnetic resonance spectroscopy studies of restricted volumes. 4,878,021, Cl. 324-309.000.
Graphoplast S.p.A.: *See—*
Piana, Ivana; and Piana, Silvano, 4,876,810, Cl. 40-316.000.
Gray, Kenneth P., to Carrier Corporation. Apparatus and method for manufacturing plate fin coils of different configurations. 4,876,779, Cl. 29-157.30R.
Grecu, George M.: *See—*
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Greene, John D.: *See—*
Chadwick, Curt H.; Sholes, Robert R.; Greene, John D.; Tucker, Francis D., III; Fein, Michael E.; Jann, P. C.; Harvey, David J.; and Bell, William, 4,877,326, Cl. 356-394.000.
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Grega nee Toth, Mrs. Erzsebet: *See—*
Neu Jozsef; Csatlos, Imre; Varga, Andras; Suranyi, Robert; Ilovai, Zoltan; Gaal, Sandor; Karsai, Jozsef; Sebestyen, Endre; Gardi, Eva; Siki, Karoly; Toth, Istvan; Gal, Guszt/e,acu/a/ v; Dombay, Zsolt; Grega nee Toth, Mrs. Erzsebet; Pavlicsak, Csaba; Tarpai, Gyula; Bonnyay, Peter; and Santha, Pal, 4,877,893, Cl. 558-86.000.
Gregory, Joseph A.; and Schaum, David L., to International Business Machines Corporation. Tilt/swivel display base. 4,877,204, Cl. 248-298.000.
Grey, Donald M., to Grey Technologies, Inc. Field crop harvesting, carton packaging and packed carton handling machine and method. 4,876,844, Cl. 53-458.000.
Grey Technologies, Inc.: *See—*
Grey, Donald M., 4,876,844, Cl. 53-458.000.
Griffin, Gregory L.: *See—*
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Griffin, Lamar H.; and Hutchins, Paul. Hydraulic ladder brace. 4,877,108, Cl. 182-68.000.
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Grim, Michael, to Yakima Products, Inc. Self-tightening vehicle roof rack. 4,877,169, Cl. 224-331.000.
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Grimm, Istvan; Stenczinger, Sandor; Bolla, Istvan; and Csanyi, Istvan, to Budapesti Radiotechnikai Gyar. Magnetic information recording and/or reading head with increased wear-resistant properties and a method for manufacturing the same. 4,876,790, Cl. 29-603.000.
Grina, Larry D.: *See—*
Kapuscinski, Maria M.; Grina, Larry D.; Jones, Ronald E.; and Sung, Rodney L., 4,877,415, Cl. 44-62.000.
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Impink, Albert J., Jr.; Langford, Francis L., Jr.; Grobmyer, Louis R.; and Luinetti, William K., 4,877,575, Cl. 376-216.000.
Grone, Dieter: *See—*
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Grosfeld, Haim: *See—*
Velan, Baruch; Cohen, Sara; Grosfeld, Haim; and Shafferman, Avigdor, 4,877,865, Cl. 530-351.000.
Gross, Heinz, to Rohm GmbH Chemische Fabrik. Process for the production of a hollow chamber plate of synthetic material. 4,877,474, Cl. 156-244.130.
Gross, Jonathan, to Mobil Oil Corporation. Method and apparatus for measuring and controlling blow-up of a foam sheet in a thermoformer oven. 4,877,564, Cl. 264-40.600.
Gross, William H.; and Cecil, James B., to Elantec. Digital protection circuit and method for linear amplifier. 4,878,034, Cl. 330-298.000.
Grossmann, Theodor: *See—*
Alt, Claus-Christian; Gobel, Rudolf; Koch, Heinz; Niechoj, Wolfgang; Grossmann, Theodor; and Deffner, Felix, 4,877,258, Cl. 277-212.0FB.
Grosso, Donald S.; Bryant, Thomas M.; and Gershonowitz, Mitchell S., to Teleco Oilfield Services Inc. Method and apparatus for filtering noise from data signals. 4,878,206, Cl. 367-83.000.
Groupe, Vincent: *See—*
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Gruendemann, Egon: *See—*
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Grundfos International A/S: *See—*
Jensen, Niels D.; and Svarre, Erik, 4,877,372, Cl. 415-199.100.
Grushkin, Bernard; Chang, Hui; and Ruhland, John G., to Xerox Corporation. Imaging processes with cold pressure fixable toner compositions. 4,877,707, Cl. 430-106.600.
Grzesik, Ulrich: *See—*
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Devir, Daniel D., 4,877,992, Cl. 313-318.000.
Mizuhara, Howard; and Huebel, Eugene, 4,877,692, Cl. 428-673.000.

Guenther, Kenneth L.; Rabindran, Karavattuveetil G.; Faber, Thomas J.; and Abrams, Jack S., to Bell & Howell Company. Sheet feed hopper for insertion machine. 4,877,346, Cl. 400-624.000.

Guenther, Werner: *See*—
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Gulko, George M.: *See*—
Martin, Michael C.; McCracken, Beth E.; and Gulko, George M., 4,876,987, Cl. 122-504.200.

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Gunter Horst Rohm: *See*—
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Gupta, Balaram, to Hoechst Celanese Corporation. Selective hydrolysis of copolymers of para-acetoxy styrene and allyl esters of ethylenically unsaturated acids. 4,877,843, Cl. 525-344.000.

Gupta, Krishanu: *See*—
Bogen, Daniel; and Gupta, Krishanu, 4,877,035, Cl. 128-673.000.

Guslits, Vladimir S.; and Weitzel, Richard A., to Eastman Kodak Company. Developer station for a reproduction apparatus. 4,878,089, Cl. 355-253.000.

Gutermuth, Paul. Separator for gaseous fluids. 4,877,430, Cl. 55-269.000.

Gutschmit, Alan. Tubular conduit for transporting traveling textile yarn. 4,877,170, Cl. 226-196.000.

Guttmann, Daniele: *See*—
Donati, Jean R.; Guttmann, Daniele; Rouillon, Yves; Paul, Pierre S.; and Zacharie, Guy, 4,877,465, Cl. 148-428.000.

Guzewska, Maria E.: *See*—
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Haas, Karl-Heinz: *See*—
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Haase, Dieter; and Spiratos, Nelu, to Handy Chemicals Ltd. Method for producing aqueous solutions of basic poly aluminum sulphate. 4,877,597, Cl. 423-556.000.

Hachiya, Iwao: *See*—
Koyano, Tetsuo; Sagi, Nobuo; Izumi, Tsugio; Fujita, Setsuya; Murata, Tadahiko; Hachiya, Iwao; and Mori, Hiroyuki, 4,877,636, Cl. 426-607.000.

Hachiya, Satoshi; Uchida, Shunji; and Hashimoto, Kenji, to Idemetsu Kosan Co., Ltd. Liquid-crystalline polymer. 4,877,858, Cl. 528-100.000.

Hachiya, Terumi: *See*—
Tsuji, Masayoshi; Nakagawa, Akira; Inoue, Hisataka; Hachiya, Terumi; Tanoue, Yoshihiro; Ikesue, Kouichi; Saita, Masaru; Mizoguchi, Takenobu; Aoki, Testsuo; Sato, Hironobu; and Nodo, Kanji, 4,877,876, Cl. 544-133.000.

Hackett, Jeffrey K., to Hackett, Jeffrey K. Load leveling shock absorber. 4,877,223, Cl. 267-64.170.

Hada, Mitsue: *See*—
Nishida, Konosuke; Hada, Mitsue; and Hiki, Shozo, 4,877,534, Cl. 210-691.000.

Haddock, Ernest: *See*—
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Haeberle, Ronald M., Jr.; Smith, Gaylord D.; Weber, John H.; Fisher, Roneldo L.; Gaul, David J.; and Hinze, Jay W., to Inco Alloys International, Inc.; and Owens-Corning Fiberglas Corporation. Mechanically alloyed nickel-cobalt-chromium-iron composition of matter and glass fiber method and apparatus for using same. 4,877,435, Cl. 65-1.000.

Haentjens, Walter D.; and Stirling, Thomas E., to Barrett, Haentjens & Company. Centrifugal oxygenator and method for treatment of waste water. 4,877,532, Cl. 210-629.000.

Haftmann, Johannes; and Schmeykal, Rudolf, to Ta Triumph-Adler Aktiengesellschaft. Keyboard for typewriters or similar machines. 4,877,347, Cl. 400-479.000.

Haga, Toru: *See*—
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Hagemeyer, Bruce A., to Rolscreen Company. Panel joint. 4,876,838, Cl. 52-455.000.

Hagihara, Hisao; Banno, Takayuki; Miya, Shigenori; and Tanaka, Norio, to Toyo Radiator Co., Ltd. Method of manufacturing a motorcycle radiator. 4,876,778, Cl. 29-157.30A.

Hagikura, Hirofumi; and Kawamoto, Haruki, to Nihon Radiator Co., Ltd. Drive control device for motor actuator in automobile air conditioner. 4,878,001, Cl. 318-446.000.

Hagiwara, Toshiyuki: *See*—
Kiyohara, Kazuto; Hagiwara, Toshiyuki; Nakadate, Takanori; Harada, Ichiya; Noguchi, Kentaro; Sakae, Shigeru; and Okuma, Kazuhiro, 4,877,819, Cl. 523-200.000.

Hagstrom, Stig B. M.: *See*—
Kazan, Benjamin; and Hagstrom, Stig B. M., 4,878,213, Cl. 369-126.000.

Hahn, Alfred; and Vogel, Georg, to Siemens Aktiengesellschaft. Apparatus for non-contacting disintegration of concretions. 4,877,017, Cl. 128-24.00A.

Haire, William M.; and Pou, Celestino, to Hydrocarbon Sciences, Inc. Oil characteristic improvement process and device therefor. 4,877,513, Cl. 208-106.000.

Hait, Paul W., to Pyromid, Inc. Outdoor cooking unit with disposable component. 4,877,010, Cl. 126-9.00A.

Halemane, Thirumala R.; and Korotky, Steven K., to American Telephone and Telegraph Company; and AT&T Bell Laboratories. Faser cavity optical memory with optical storage and readout. 4,877,952, Cl. 250-213.00A.

Hall, Dale R.; and Keller, Dennis J., to BF Goodrich Company, The. Soft thermoplastic polyurethane for blown film application. 4,877,856, Cl. 528-44.790.

Hall, Mark J.; Powers, Joseph R.; and Wood, William A., to Dow Chemical Company, The. Stabilizer concentrate. 4,877,821, Cl. 523-351.000.

Hallemann, Raymond F.: *See*—
Cantwell, Robert R.; Hallemann, Raymond F.; and Zumsteg, Deborah M., 4,877,044, Cl. 135-104.000.

Halliburton Company: *See*—
Priest, Mark A., 4,877,956, Cl. 250-259.000.
Zunkel, Gary D., 4,877,086, Cl. 166-106.000.

Hallings, Leonard L.; and Steiner, Richard W., to MDT Corporation. Quick release focusing handle for surgical lights. 4,878,156, Cl. 362-109.000.

Halpern, John W., to Paperless Accounting, Inc. Electronic purse-device. 4,877,950, Cl. 235-487.000.

Halssig, Andreas: *See*—
Schillinger, Wolfgang; Halssig, Andreas; and Zehnder, Wolfgang, 4,876,960, Cl. 102-249.000.

Halvorsen, Svein T.: *See*—
Strandli, Kare R.; and Halvorsen, Svein T., 4,876,964, Cl. 102-499.000.

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Overweg, Johannes A.; and Ham, Cornelis L. G., 4,878,023, Cl. 324-318.000.
Overweg, Johannes A.; and Ham, Cornelis L. G., 4,878,024, Cl. 324-319.000.

Hamada, Akiyoshi: *See*—
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Hamada, Hisanori: *See*—
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Hamada, Makoto: *See*—
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Hamada, Masataka; Karasaki, Toshihiko; Matsui, Toru; and Maekawa, Yukio, to Minolta Camera Kabushiki Kaisha. Focus detecting device. 4,878,079, Cl. 354-402.000.

Hamaguchi, Naoru: *See*—
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Hamanaka, Toshiyuki, to NGK Insulators, Ltd. Cordierite honeycomb structural body and method of producing the same. 4,877,670, Cl. 428-116.000.

Hamlin Incorporated: *See*—
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Hanada, Koji; Sawamura, Masashi; Yoshikawa, Takeshi; Nihashi, Hiroyuki; and Tanaka, Tsuneo, to Toyo Ink Manufacturing Co., Ltd. Heat-sensitive transfer material. 4,877,681, Cl. 428-336.000.

Handelsman, Jo; Mester, Ellen H.; and Wunderlich, Lynn, to Wisconsin Alumni Research Foundation. Biological control of damping off and root rot and inoculum preparation therefor. 4,877,738, Cl. 435-252.500.

Handy Chemicals Ltd.: *See*—
Haase, Dieter; and Spiratos, Nelu, 4,877,597, Cl. 423-556.000.

Hankins, Larry W.: *See*—
Endrenyi, Frank, Jr.; and Hankins, Larry W., 4,877,669, Cl. 428-88.000.

Hannen, Reiner; and Vermeulen, Norbert, to MSK-Verpackungs-Systeme Gesellschaft. Apparatus for producing hot gas for the shrinkage of synthetic resin foils. 4,877,012, Cl. 126-79.00R.

Hansen, John B.: *See*—
Biere, Helmut; Huth, Andreas; Rahtz, Dieter; Schmiechen, Ralph; Seidelmann, Dieter; Stephens, David N.; Engelstoft, Mogens; and Hansen, John B., 4,877,792, Cl. 514-292.000.

Hanshim Kikagaku Kabushiki Kaisha: *See*—
Nishida, Konosuke; Hada, Mitsue; and Hiki, Shozo, 4,877,534, Cl. 210-691.000.

Hanson, Donald W. Tracheostomy tube valve apparatus. 4,877,025, Cl. 128-207.160.

Hanson, Gunnar J.; and Baran, John S., to G. D. Searle & Co. Non-peptidyl beta-succinamidoacyl aminodiols as anti-hypertensive agents. 4,877,785, Cl. 514-224.200.

Hanssler, Gerd: *See*—
Weissmuller, Joachim; Berg, Dieter; Hanssler, Gerd; and Reinecke, Paul, 4,877,786, Cl. 514-236.800.

Hara, Hideaki: *See*—
Iemura, Ryuichi; Hori, Manabu; Ohtaka, Hiroshi; Sukamoto, Takayuki; Hara, Hideaki; and Ito, Keizo, 4,877,790, Cl. 514-260.000.

Harada, Ichiya: *See*—
Kiyohara, Kazuto; Hagiwara, Toshiyuki; Nakadate, Takanori; Harada, Ichiya; Noguchi, Kentaro; Sakae, Shigeru; and Okuma, Kazuhiro, 4,877,819, Cl. 523-200.000.

Haralson, Katherine. Emergency car call kit. 4,876,812, Cl. 40-592.000.
Harandi, Mohsen N.; and Owen, Hartley. Single zone oligomerization of olefins in a super-dense phase turbulent fluid bed. 4,877,921, Cl. 585-533.000.
Harasym, Michael F., to Vesuvius Crucible Company. Telescoping device for unplugging a vessel discharge port. 4,877,161, Cl. 222-591.000.
Harbeke, Gerold J. Automatically-releasable pipe-attachment device. 4,877,216, Cl. 249-207.000.
Harben, Grover S., III; and Clark, Leonard G. Vent cleaning apparatus and method for poultry. 4,876,767, Cl. 17-11.000.
Harbison, Kenneth G.: *See—*
Chen, Chung Y.; Riecke, Edgar E.; Harbison, Kenneth G.; and Chapman, Derek D., 4,877,724, Cl. 430-621.000.
Harden, Bonnie J. Method and apparatus for dispersing cremated remains. 4,877,203, Cl. 244-136.000.
Hargett, Wyatt P., Jr.: *See—*
Floyd, Terry S.; and Hargett, Wyatt P., Jr., 4,877,624, Cl. 426-241.000.
Haring, Ulrich, to Ciba-Geigy Corporation. Corrosion inhibitor. 4,877,552, Cl. 252-392.000.
Harman, Mitchell: *See—*
Pitha, Josef; Harman, Mitchell; and Uekama, Kaneto, 4,877,774, Cl. 514-26.000.
Harp, Emogene. Method of treating soybeans. 4,877,637, Cl. 426-634.000.
Harpell, Gary A.: *See—*
Kavesh, Sheldon; Prevorsek, Dusan C.; and Harpell, Gary A., 4,876,774, Cl. 28-166.000.
Harper, Stephen D., to Arco Chemical Technology, Inc. Purification of polyols prepared using double metal cyanide complex catalysts. 4,877,906, Cl. 568-621.000.
Harris, Carl B., to Thomas Smith Co. Inc. Valve handle. 4,877,050, Cl. 137-315.000.
Harris, Jeffery R.: *See—*
Hines, John B.; and Harris, Jeffery R., 4,877,411, Cl. 8-403.000.
Harris, Robert S., to Stant Inc. Vacuum controlled vapor recovery system. 4,877,146, Cl. 220-85.0VR.
Harris, Walter: *See—*
Goleczka, Joseph; Harris, Walter; and Pringle, John, 4,877,418, Cl. 44-600.000.
Harrison, Nicholas D.: *See—*
Rash, Mark S.; Harrison, Nicholas D.; and Butler, F. Prince, 4,878,238, Cl. 379-62.000.
Hart & Cooley, Inc.: *See—*
Vork, Donald J., 4,876,951, Cl. 98-107.000.
Hart, LeRoy. Jumping shoe. 4,876,804, Cl. 36-7.800.
Hart, Timothy R.: *See—*
Kuder, James E.; McGinnis, James L.; Goldberg, Harris A.; Hart, Timothy R.; and Che, Tessie M., 4,878,224, Cl. 372-53.000.
Hartmann, Werner: *See—*
Schrors, Gunter; Brendel, Bernhard; and Hartmann, Werner, 4,877,331, Cl. 374-153.000.
Hartsfield, Ben W. Competitive computer educational game. 4,877,408, Cl. 434-350.000.
Hartsing, Tyler F., Jr.: *See—*
Sauers, Marvin E.; Hartsing, Tyler F., Jr.; and McMaster, Lee P., 4,877,682, Cl. 428-412.000.
Hartwell Corporation, The: *See—*
Poe, L. Richard, 4,877,274, Cl. 292-113.000.
Harvey, David J.: *See—*
Chadwick, Curt H.; Sholes, Robert R.; Greene, John D.; Tucker, Francis D., III; Fein, Michael E.; Jann, P. C.; Harvey, David J.; and Bell, William, 4,877,326, Cl. 356-394.000.
Hasegawa, Masamitsu; Tamura, Satoshi; Wakashima, Takashi; and Sugiyama, Isao, to Shin-Etsu Polymer Co., Ltd. Sheet material for ink-jet printing. 4,877,678, Cl. 428-216.000.
Hasegawa, Saburo; and Minai, Eiji, to Matsushita Electric Industrial Co., Ltd. Loading apparatus for a magnetic disk cartridge. 4,878,139, Cl. 360-99.020.
Hashimoto Corporation: *See—*
Hashimoto, Kazuo, 4,878,243, Cl. 379-211.000.
Hashimoto, Kazuo, to Hashimoto Corporation. Call forwarding system and method. 4,878,243, Cl. 379-211.000.
Hashimoto, Kenichi: *See—*
Fuyama, Moriaki; Tamura, Katsumi; Taguchi, Kazuo; Onisawa, Kenichi; Sato, Akira; Hashimoto, Kenichi; Nakayama, Takahiro; and Abe, Yoshio, 4,877,994, Cl. 313-503.000.
Hashimoto, Kenji: *See—*
Hachiya, Satoshi; Uchida, Shunji; and Hashimoto, Kenji, 4,877,858, Cl. 528-100.000.
Hashimoto, Kiyokazu, to NEC Corporation. Semiconductor memory device. 4,878,220, Cl. 371-40.100.
Hashimoto, Koji: *See—*
Suzuki, Hiroaki; Kataoka, Yoshiyuki; Murase, Michio; Inoue, Kotaro; Sumida, Isao; Yamanari, Shozo; Matsumoto, Masaki; Miura, Satoshi; and Hashimoto, Koji, 4,877,574, Cl. 376-216.000.
Hashimoto, Norio: *See—*
Kotera, Masahide; Konishi, Motofumi; Ando, Yoshio; Iwaya, Toshio; Tanaka, Kanou; Hashimoto, Norio; Sugita, Yasutoshi; Sano, Yoshitaka; and Ono, Satoshi, 4,878,250, Cl. 382-56.000.
Hasler Freres International S.A.: *See—*
Limon, Bernard, 4,876,904, Cl. 73-866.000.
Hasselmann, Heinz: *See—*
Flaig, Heinz; Neumann, Udo; Hasselmann, Heinz; Zacharias, Karl; Horbach, Rainer; and Bitsch, Harald, 4,877,987, Cl. 310-209.000.
Hastasider Metal S.R.L.: *See—*
Bussolino, Romolo, 4,876,784, Cl. 29-402.060.
Hatakeyama, Hiroki: *See—*
Azegami, Kiyotaka; Tayama, Suehiro; Yamamoto, Naoki; Yanagase, Akira; and Hatakeyama, Hiroki, 4,877,687, Cl. 428-520.000.
Hatakeyama, Noboru: *See—*
Morita, Shizuo; Hayakawa, Kazushi; Ito, Kunio; Matsuo, Shunji; Fukuchi, Masakazu; and Hatakeyama, Noboru, 4,878,091, Cl. 355-260.000.
Hattman, Fredric J.: *See—*
Gefroh, James A.; and Hattman, Fredric J., 4,876,833, Cl. 52-107.000.
Hattori, Michinobu; Fujisawa, Hidemitsu; and Kusaura, Akio, to Mitsubishi Denki Kabushiki Kaisha. Optical disc with inhibited thermal distortion. 4,877,667, Cl. 428-64.000.
Hattori, Norikazu; Urabe, Sunao; and Kusumoto, Koshi, to Tokuyama Soda Kabushiki Kaisha. Curable composition. 4,877,854, Cl. 528-15.000.
Hattori, Yoshimasa: *See—*
Kuroda, Masami; Hattori, Yoshimasa; Furusho, Noboru; and Sugata, Yoshinobu, 4,877,703, Cl. 430-76.000.
Hatwar, Tukaram K.: *See—*
Glocker, David A.; Hatwar, Tukaram K.; McIntire, Gregory Lynn; Rao, Srinivas T.; and Stinson, Douglas G., 4,877,690, Cl. 428-627.000.
Hauri, Bernhard; and Etter, Hans, to Kern & Co. AG. Optical sighting device with illuminated aiming mark. 4,877,324, Cl. 356-251.000.
Havemann, Robert H., to Texas Instruments Incorporated. Bipolar process for forming shallow NPN emitters. 4,877,748, Cl. 437-31.000.
Hayakawa, Kazushi: *See—*
Morita, Shizuo; Hayakawa, Kazushi; Ito, Kunio; Matsuo, Shunji; Fukuchi, Masakazu; and Hatakeyama, Noboru, 4,878,091, Cl. 355-260.000.
Hayakawa, Kiyoharu; and Tomizawa, Takashi, to Brother Kogyo Kabushiki Kaisha. Pressure developing device in image recording apparatus. 4,878,083, Cl. 355-27.000.
Hayakawa, Kiyoharu; Matsumoto, Yumio; Ueda, Masashi; Sago, Akira; and Tagaki, Osamu, to Brother Kogyo Kabushiki Kaisha. Method and device for feeding sheet in image recording apparatus. 4,878,084, Cl. 355-27.000.
Hayasaki, Hideto: *See—*
Takakura, Masaki; Hayasaki, Hideto; Takemura, Hideo; Izumi, Masao; Iwasaki, Keisuke; Noguchi, Yoji; Yamane, Yasukuni; and Kako, Noritoshi, 4,878,178, Cl. 364-521.000.
Hayasaki, Koichi, to Nissan Motor Co., Ltd. Hydraulic control system for automatic automotive transmission. 4,876,925, Cl. 74-868.000.
Hayashi, Eiichi: *See—*
Yaso, Masao; Suzuki, Yukio; Shibata, Kensuke; and Hayashi, Eiichi, 4,877,875, Cl. 544-116.000.
Yaso, Masao; Suzuki, Yukio; Shibata, Kensuke; and Hayashi, Eiichi, 4,877,877, Cl. 544-354.000.
Hayashi, Kimitaka: *See—*
Tatebayashi, June; Takada, Tomoaki; Hayashi, Kimitaka; and Kumagai, Chikanori, 4,877,397, Cl. 432-106.000.
Hayashi, Mishio, to Advantest Corporation. Data pattern synchronizer. 4,878,233, Cl. 375-116.000.
Hayashi, Nobuaki. Method of reinforcing a guitar neck. 4,877,070, Cl. 144-364.000.
Hayashi, Torahiko, to Rheon Automatic Machinery Co. Method for producing composite food having a controlled composition of materials. 4,877,623, Cl. 426-231.000.
Hayashi, Yoshiaki; Itakura, Takeshi; Kato, Toyoji; and Koshidaka, Yukio, to Yoshino Kogyosho Co., Ltd. Pressure resistant bottle-shaped container. 4,877,141, Cl. 215-1.00C.
Hayes, Donald J.; Wallace, David B.; Verlee, Donald J.; and Houseman, Kenneth R., to Abbott Laboratories. Apparatus and process for reagent fluid dispensing and printing. 4,877,745, Cl. 436-166.000.
Haynes, Kenneth A. Game apparatus. 4,877,245, Cl. 273-110.000.
Haywood, James E.: *See—*
Disselkoen, Allen D., Jr.; Gargiulo, Robert F.; Haywood, James E.; Heise, Keith H.; Holcomb, Darrell H.; Kramer, Stuart C.; Miller, Gregory R.; Nicholson, Jeffrey S.; Olinger, Jeffrey J.; and Spenny, Curtis H., 4,877,202, Cl. 244-122.00A.
Heatzig, Eric; Slocum, Alexander; and Thurston-Slocum, Debra, to Advanced Engineering Systems, Operations & Products, Inc. Multi-axis DSP-based parallel processing servo controller for machine tools and robots. 4,878,002, Cl. 318-568.200.
Heckart, Daniel R.: *See—*
Rabourn, William B.; and Heckart, Daniel R., 4,876,760, Cl. 15-97.00B.
Hee, Roland, to JES, LP. Crocheted fabric elastic wrist bracelet bearing an interior conductive yarn. 4,878,148, Cl. 361-220.000.
Hehl, Karl. Locking apparatus for locking a detachably mounted plasticizing cylinder of a plasticizing unit in operative position to a carrying block of an injection unit of an injection molding machine. 4,877,389, Cl. 425-190.000.
Heidt, Thomas D.: *See—*
Neuman, Arnold I.; Heidt, Thomas D.; Bergman, Andrew; and Wickstead, James, 4,877,954, Cl. 250-222.200.
Heil, Ernst: *See—*
Siol, Werner; Heil, Ernst; Wenzel, Franz; Arndt, Peter J.; and Terbrack, Ulrich, 4,877,853, Cl. 526-329.700.
Heinze, Roland; and Liess, Hans-Dieter, to Siemens Aktiengesellschaft; and Siemens Aktiengesellschaft. Sensor arrangement for the control of implantable devices. 4,877,032, Cl. 128-419.0PG.

Heise, Keith H.: *See—*
Disselkoen, Allen D., Jr.; Gargiulo, Robert F.; Haywood, James E.; Heise, Keith H.; Holcomb, Darrell H.; Kramer, Stuart C.; Miller, Gregory R.; Nicholson, Jeffrey S.; Olinger, Jeffrey J.; and Spenny, Curtis H., 4,877,202, Cl. 244-122.00A.

Heisson, Gary J. Fluid waste transporter. 4,877,261, Cl. 280-47.260.

Heki, Tatsuo: *See—*
Hirano, Shigeo; Inoue, Noriyuki; and Heki, Tatsuo, 4,877,723, Cl. 430-598.000.

Helanniemi, Jorma T.: *See—*
von Alfthan, George C.; and Helanniemi, Jorma T., 4,876,902, Cl. 73-863.830.

Heller, Heinz; and Waigand, Roland, to Alexander Wiegand GmbH & Co. Pressure guage connection. 4,876,894, Cl. 73-756.000.

Helm, Charles W.; and Koval, Vernon E., to Teleco Oilfield Services Inc. Near bit offset stabilizer. 4,877,092, Cl. 175-74.000.

Henderson, David: *See—*
Maly, Friedrich E.; de Week, Alain L.; and Henderson, David, 4,877,742, Cl. 436-65.000.

Hendricks, David. Foot deodorant. 4,877,605, Cl. 424-65.000.

Henkel Kommanditgesellschaft auf Aktien: *See—*
Buchmeier, Willi; and Brodalla, Dieter, 4,877,495, Cl. 204-42.000.
Ploog, Uwe; and Uphues, Guenter, 4,877,539, Cl. 252-8.800.
Wilsberg, Heinz-Manfred; and Puchta, Rolf, 4,877,556, Cl. 252-544.000.

Henrickson, James A.: *See—*
Long, Lawrence J.; and Henrickson, James A., 4,877,079, Cl. 164-468.000.

Hensby, Christopher: *See—*
Shroot, Braham; Hensby, Christopher; Maignan, Jean; Lang, Gerard; Restle, Serge; and Colin, Michel, 4,877,789, Cl. 514-255.000.

Herault, Didier: *See—*
Cazaux, Yvon; Herault, Didier; Thenoz, Yves; and Blanchard, Pierre, 4,878,103, Cl. 357-24.000.

Hercules Incorporated: *See—*
Cowan, Patrick J., 4,877,820, Cl. 523-222.000.
Lukacs, Alexander, III, 4,877,551, Cl. 252-378.00R.

Herlant, Michel A.: *See—*
Kirjanov, Alexander S.; and Herlant, Michel A., 4,877,538, Cl. 252-8.700.

Herman Miller, Inc.: *See—*
Kelley, James O.; Stumpf, William E.; and Friedman, Frank A., 4,876,835, Cl. 52-239.000.

Herrera, Mauro. Cart car chair. 4,877,289, Cl. 297-250.000.

Herrera, Randy G.: *See—*
Saulnier, Gary J.; Herrera, Randy G.; and Thiel, Timothy E., 4,878,029, Cl. 329-341.000.

Herriau, Jean P.: *See—*
Huignard, Jean P.; and Herriau, Jean P., 4,877,312, Cl. 350-354.000.

Herring, Robert H.: *See—*
Varghese, Alexander P.; and Herring, Robert H., 4,877,153, Cl. 220-469.000.

Hesterman, Victor W.: *See—*
Gill, Hardayal S.; Hesterman, Victor W.; Tarnopolsky, Giora J.; and Tran, Lung T., 4,878,140, Cl. 360-113.000.

Hettinger, William P.; and Beck, H. Wayne, to Ashland Oil, Inc. Carbometallic oil conversion process and catalysts. 4,877,514, Cl. 208-120.000.

Heubeck, Erich: *See—*
Pfeiffer, Joachim; Guenther, Werner; Muether, Manfred; and Heubeck, Erich, 4,878,234, Cl. 378-40.000.

Heusquin, Anke: *See—*
Heusquin, Guy; and Heusquin, Anke, 4,878,043, Cl. 340-521.000.

Heusquin, Guy; and Heusquin, Anke. Device for indicating hydroculture-related values. 4,878,043, Cl. 340-521.000.

Hewlett-Packard Company: *See—*
Carp, Stuart L.; Swain, Howard L.; and Nguyen, Bich N., 4,878,027, Cl. 328-15.000.
Gill, Hardayal S.; Hesterman, Victor W.; Tarnopolsky, Giora J.; and Tran, Lung T., 4,878,140, Cl. 360-113.000.

Heymanns, Willi, to Jagenberg Aktiengesellschaft. Rider roller for a roll formed in a web-winding machine. 4,877,196, Cl. 242-66.000.

Hi-Shear Corporation: *See—*
Williamson, Herman L.; and Schuster, Michael M., 4,877,363, Cl. 411-43.000.

Hickman, James A. A. Glazing unit alarm system. 4,878,044, Cl. 340-550.000.

Hicks, Darrell D.: *See—*
Keene, Donna L.; and Hicks, Darrell D., 4,877,502, Cl. 204-181.700.

Hida, Yukio: *See—*
Honma, Masahiro; Maruyama Tokuji; Okada, Masashi; and Hida, Yukio, 4,877,941, Cl. 219-130.210.

Hiechst Celanese Corporation: *See—*
Vollmann, Hansjoerg W.; Wong, George S. K.; and Bellville, Dennis, 4,877,697, Cl. 430-20.000.

Higashi, Tatsuji; and Kita, Nobuyuki, to Fuji Photo Film Co., Ltd. Process for preparing image-bearing plates. 4,877,719, Cl. 430-326.000.

Higashino, Yoshiaki: *See—*
Matsumoto, Susumu; Ohta, Hiroki; Yamada, Masahiro; Higashino, Yoshiaki; and Fukuchi, Toshiki, 4,877,804, Cl. 514-342.000.

Higer, Gary; and Mintz, Michael L. Emergency airway surgical device. 4,877,021, Cl. 128-200.760.

Higginson, John: *See—*
Bibl, Andreas; Higginson, John; and Gardner, Deane, 4,878,071, Cl. 346-153.100.

Higuchi, Kumao; Morinaga, Akio; Seshimo, Masahiro; and Saito, Hitoshi, to Tokyo Gas Kabushiki Kaisha; and Ashimori Tokyo Kabushiki Kaisha. Lining material for pipe lines. 4,877,665, Cl. 428-36.100.

Higuchi, Norio: *See—*
Kakehi, Nobuo; Takahashi, Yuzuru; Higuchi, Norio; Izumihara, Yoshikazu; Matsumoto, Hiromi; and Uehori, Yuji, 4,876,874, Cl. 72-199.000.

Higuchi, William I.; Fox, Jeffrey I.; and Powell, G. Lynn, to University of Utah. Method of preventing tooth decay by laser beam irradiation and chemical treatment. 4,877,401, Cl. 433-215.000.

Higuma, Masahiko: *See—*
Sakaki, Mamoru; Arai, Ryuichi; Akiya, Takashi; Toganoh, Shigeo; Higuma, Masahiko; Eto, Naonobu; Mouri, Hidemasa; Tobita, Michiaki; Ishida, Masahiko; and Kono, Shunzo, 4,877,680, Cl. 428-332.000.

Hiki, Shozo: *See—*
Nishida, Konosuke; Hada, Mitsue; and Hiki, Shozo, 4,877,534, Cl. 210-691.000.

Hill, David T., to Sundstrand Heat Transfer, Inc. Segmented fin heat exchanger core. 4,877,087, Cl. 165-181.000.

Hill, Robert V., to Eyedentify, Inc. Method and apparatus for measuring blood oxygen levels in selected areas of the eye fundus. 4,877,322, Cl. 351-221.000.

Hill, Troy D. Bow-mountable blind. 4,876,817, Cl. 43-1.000.

Hillemann, Craig L., to Du Pont de Nemours, E. I., and Company. Herbicidal sulfonamides. 4,877,442, Cl. 71-92.000.

Hillis, W. Daniel, to Thinking Machines Corporation. Unsynchronized multispectral video filtering system with filter identification sensor within field of view and video signal responsive. 4,878,109, Cl. 358-42.000.

Himmele, Walter: *See—*
Steiner, Gerd; Himmele, Walter; Buschmann, Ernst; Teschendorf, Hans-Juergen; and Weifenbach, Harald, 4,877,807, Cl. 514-411.000.

Hinds, Robert B.; Hutchinson, Charles B., Jr.; and Dowell, James S., to J.M. Huber Corporation. Automated sucker rod cleaning apparatus. 4,877,386, Cl. 425-110.000.

Hines, John B.; and Harris, Jeffery R., to Milliken Research Corporation. Method for color mounting the level of finish applied to textile materials and for color coding textile materials: amine-reducible fugitive tints. 4,877,411, Cl. 8-403.000.

Hingsbergen, Joseph P.: *See—*
Lee, Paul R.; and Hingsbergen, Joseph P., 4,877,758, Cl. 501-24.000.

Hino, Toshio: *See—*
Nakanishi, Akio; Hino, Toshio; Iino, Yoshio; Suetani, Kazuhisa; Houki, Yoji; and Ikuta, Hirotoshi, 4,878,088, Cl. 355-244.000.

Hinotani, Hiroaki, to Alps Electric Co., Ltd. Objective lens supporting device for optical pickup. 4,878,214, Cl. 369-256.000.

Hintermeier, Karl: *See—*
Engelhardt, Fritz; Hintermeier, Karl; Muller, Manfred; Munch, Norbert; and Wagener, Hans, 4,877,540, Cl. 252-8.750.

Hinton, Dennis L.: *See—*
Berecz, Imre; Schultz, Dennis; and Hinton, Dennis L., 4,877,362, Cl. 411-34.000.

Hinz, Paul; Dislich, Helmut; and Weber, Gerhard, to Schott Glaswerke. Pressure vessel sight glasses. 4,877,668, Cl. 428-68.000.

Hinze, Jay W.: *See—*
Haeberle, Ronald M., Jr.; Smith, Gaylord D.; Weber, John H.; Fisher, Roneldo L.; Gaul, David J.; and Hinze, Jay W., 4,877,435, Cl. 65-1.000.

Hipona, Maria B. L.: *See—*
Darley, Henry M.; Gill, Michael C.; Earl, Dale C.; Ngo, Dinh T.; Wang, Paul C.; Hipona, Maria B. L.; and Dodrill, Jim, 4,878,190, Cl. 364-752.000.

Hirabayashi, Masaya; and Noda, Iwao, to Kyocera Corporation. Artificial tooth crown and method of producing the same. 4,877,402, Cl. 433-218.000.

Hirai, Yutaka: *See—*
Matsuyama, Jinsho; Hirai, Yutaka; Ueki, Masao; and Sakai, Akira, 4,877,650, Cl. 427-248.100.

Hiraide, Takao: *See—*
Tanaka, Susumu; Sato, Masaaki; Kaeriyama, Kyoji; Suda, Yoshio; and Hiraide, Takao, 4,877,852, Cl. 526-256.000.

Hirakawa, Noboru; and Inoue, Yasukazu, to NEC Corporation. Semiconductor device having wiring layer composed of silicon film and aluminum film with improved contact structure thereof. 4,878,105, Cl. 357-59.000.

Hirano, Muneyoshi: *See—*
Komori, Akihiro; and Hirano, Muneyoshi, 4,877,076, Cl. 160-107.000.

Hirano, Shigeo; Inoue, Noriyuki; and Heki, Tatsuo, to Fuji Photo Film Co., Ltd. Silver halide photographic material comprising a specified nucleating agent. 4,877,723, Cl. 430-598.000.

Hirasawa, Masahide: *See—*
Yasumura, Hiroto; Hirasawa, Masahide; Noji, Minoru; Kozuki, Susumu; Takahashi, Koji; Yoshimura, Katsuji; and Sasatani, Tomohiko, 4,878,128, Cl. 358-315.000.

Hirata, Kiminori: *See—*
Taniguchi, Masakazu; Hirose, Masayoshi; Baba, Masatoshi; Hirata, Kiminori; and Ochiai, Yoshinori, 4,877,787, Cl. 514-247.000.

Hiro, Masaaki; Kimura, Tomohiro; Tanaka, Hisami; Kashimura, Noboru; Tanaka, Shigemori; Tohma, Hitoshi; and Hisamura,

Masafumi, to Canon Kabushiki Kaisha. Photosensitive member for electrophotography. 4,877,701, Cl. 430-59.000.

Hirochi, Kumiko; Kitabatake, Makoto; and Yamazaki, Osamu, to Matsushita Electric Industrial Co., Ltd. Wear-protected device. 4,877,677, Cl. 428-216.000.

Hirose, Masayoshi: *See—*
Taniguchi, Masakazu; Hirose, Masayoshi; Baba, Masatoshi; Hirata, Kiminori; and Ochiai, Yoshinori, 4,877,787, Cl. 514-247.000.

Hisamitsu Pharmaceutical Co., Inc.: *See—*
Tsuji, Masayoshi; Nakagawa, Akira; Inoue, Hisataka; Hachiya, Terumi; Tanoue, Yoshihiro; Ikesue, Kouichi; Saita, Masaru; Mizoguchi, Takenobu; Aoki, Testsuo; Sato, Hironobu; and Nodo, Kanji, 4,877,876, Cl. 544-133.000.

Hisamura, Masafumi: *See—*
Hiro, Masaaki; Kimura, Tomohiro; Tanaka, Hisami; Kashimura, Noboru; Tanaka, Shigemori; Tohma, Hitoshi; and Hisamura, Masafumi, 4,877,701, Cl. 430-59.000.

Hitachi Engineering Co., Ltd.: *See—*
Suzuki, Hiroaki; Kataoka, Yoshiyuki; Murase, Michio; Inoue, Kotaro; Sumida, Isao; Yamanari, Shozo; Matsumoto, Masaki; Miura, Satoshi; and Hashimoto, Koji, 4,877,574, Cl. 376-216.000.

Hitachi Koki Company, Limited: *See—*
Watahiki, Shinichi; Itoh, Nobuhiko; Ihata, Nobuo; and Miyasaka, Masao, 4,877,344, Cl. 400-124.000.

Hitachi, Ltd.: *See—*
Fujisaki, Kunio, 4,877,945, Cl. 235-379.000.
Fukuda, Takuya; Mochizuki, Yasuhiro; Momma, Naohiro; Takahashi, Shigeru; Suzuki, Noboru; Sonobe, Tadasi; Chiba, Kiyosi; and Suzuki, Kazuo, 4,876,983, Cl. 118-722.000.
Fuyama, Moriaki; Tamura, Katsumi; Taguchi, Kazuo; Onisawa, Kenichi; Sato, Akira; Hashimoto, Kenichi; Nakayama, Takahiro; and Abe, Yoshio, 4,877,994, Cl. 313-503.000.
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Mifune, Toshimi; Morooka, Yasuo; Shojima, Hiroshi; Mori, Junko; and Fukunaga, Yasushi, 4,878,249, Cl. 382-13.000.
Nakagawa, Koji; Takagi, Takeo; Abe, Yoshiaki; and Sakai, Haruki, 4,877,370, Cl. 415-148.000.
Obata, Takeshi; and Kobayashi, Hideaki, 4,876,847, Cl. 57-100.000.
Ogasa, Takaaki, 4,877,993, Cl. 313-414.000.
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Hobson, Richard S.; and Potter, David, to J. B. Two Corporation. Adjustable width bicycle seat. 4,877,286, Cl. 297-195.000.

Hochuli, Frich: *See—*
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Hodgkins, David H.; and Janik, Leon P., to Stanadyne Automotive Corp. Spray nozzle assembly for piston cooling. 4,876,990, Cl. 723-41.350.

Hoechst Aktiengesellschaft: *See—*
Kampe, Klaus-Dieter; Raether, Wolfgang; and Dittmar, Walter, 4,877,878, Cl. 544-368.000.
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Vollmann, Hansjoerg W.; Wong, George S. K.; and Bellville, Dennis, 4,877,697, Cl. 430-20.000.

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Gupta, Balaram, 4,877,843, Cl. 525-344.000.
Keene, Donna L.; and Hicks, Darrell D., 4,877,502, Cl. 204-181.700.
Kuder, James E., 4,878,212, Cl. 369-100.000.
Kuder, James E.; McGinnis, James L.; Goldberg, Harris A.; Hart, Timothy R.; and Che, Tessie M., 4,878,224, Cl. 372-53.000.
Rafalko, Joseph J., 4,877,849, Cl. 525-433.000.
Teng, Chia-Chi; and Stuetz, Dagobert E., 4,877,298, Cl. 350-96.140.
Vora, Rohitkumar H.; Khanna, Dinesh N.; and Fontaine, Suzanne, 4,877,653, Cl. 427-385.500.

Hoefelmayr, Tilman. Temple. 4,877,062, Cl. 139-294.000.

Hoelke, Steven T.: *See—*
Larsen, Robert P.; Hoelke, Steven T.; and Luisi, James A., 4,878,179, Cl. 364-490.000.

Hoeprich, Michael R., to Timken Company, The. Process for deriving the contact geometry for raceways and rollers of a roller bearing. 4,877,340, Cl. 384-571.000.

Hoffmann-La Roche Inc.: *See—*
Cohen, Noal, 4,877,890, Cl. 549-407.000.
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Hogan, Mark R.: *See—*
Neville, Donald G.; Giordano, David A.; and Hogan, Mark R., 4,877,106, Cl. 181-224.000.

Hoisington, Paul A.: *See—*
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Holcomb, Darrell H.: *See—*
Disselkoen, Allen D., Jr.; Gargiulo, Robert F.; Haywood, James E.; Heise, Keith H.; Holcomb, Darrell H.; Kramer, Stuart C.; Miller, Gregory R.; Nicholson, Jeffrey S.; Olinger, Jeffrey J.; and Spenny, Curtis H., 4,877,202, Cl. 244-122.00A.

Holden, W. Bruce. Eye-shielding glasses. 4,877,320, Cl. 351-44.000.

Holmlund, Erling S.: *See—*
Jansson, Gunnel B.; and Holmlund, Erling S., 4,877,746, Cl. 436-518.000.

Holodnak, Richard S.: *See—*
Riley, Gilbert N.; Holodnak, Richard S.; and Malin, Richard A., 4,876,956, Cl. 101-91.000.

Holsclaw, Linda A. Dental bridge and method. 4,877,400, Cl. 433-183.000.

Holt, J. Birch; Kingman, Donald D.; and Bianchini, Gregory M., to University of California, Regents of the. One step process for producing dense aluminum nitride and composites thereof. 4,877,759, Cl. 501-96.000.

Holtslander, Roger A., to Wolf Engineering Corporation. Proportional firing circuit. 4,878,011, Cl. 323-319.000.

Home Fashions, Inc.: *See—*
Ebert, George W., 4,877,077, Cl. 160-236.000.

Homeier, Ronald F.: *See—*
Anthony, James R.; Merrick, David; Homeier, Ronald F.; and Lortz, Allan R., 4,876,772, Cl. 24-637.000.

Honda Giken Kogyo K.K.: *See—*
Noguchi, Kunio; Koike, Yuzuru; and Toshimits, Kazushige, 4,877,006, Cl. 123-589.000.
Wazaki, Yoshio; and Kudo, Keisuke, 4,877,273, Cl. 290-40.00C.
Yamagata, Tetsuo, 4,878,045, Cl. 340-556.000.

Honda Giken Kogyo Kabushiki Kaisha: *See—*
Asanuma, Nobuyoshi, 4,877,098, Cl. 180-79.100.
Mugikura, Norio, 4,877,105, Cl. 181-141.000.
Nakajima, Toyohei; and Mieno, Toshiyuki, 4,877,511, Cl. 204-406.000.
Otobe, Yutaka; and Kishi, Noriyuki, 4,876,995, Cl. 123-90.120.
Shimizu, Yasuo, 4,878,004, Cl. 318-599.000.
Yamamoto, Yasuhiro; Miwa, Teiji; and Ajima, Tadashi, 4,876,786, Cl. 29-429.000.

Honda, Sumio; Ogata, Taizo; and Etani, Tadao, to Japan Tobacco Inc./Tokyo Automatic Machinery Works Ltd. Apparatus for applying seal-strips to packages travelling on a conveyor. 4,876,839, Cl. 53-137.000.

Honeywell Inc.: *See—*
Lee, James C., 4,877,504, Cl. 204-192.110.
Walker, Charles S., 4,877,982, Cl. 307-571.000.

Hongo, Masafumi; Shigemitsu, Hideyuki; Yamamoto, Naoki; and Yanagase, Akira, to Mitsubishi Rayon Co., Ltd. Polycarbonate resin composition. 4,877,831, Cl. 525-63.000.

Honma, Kanehito; Yokoi, Tsutomu; and Tani, Hiroji, to Murata Manufacturing Co., Ltd. Resistance paste. 4,877,554, Cl. 252-511.000.

Honma, Masahiro; Maruyama Tokuji; Okada, Masashi; and Hida, Yukio, to Kabushiki Kaisha Kobe Seiko Sho. Power supply system for consumable electrode arc welding and method of controlling the same. 4,877,941, Cl. 219-130.210.

Hoonsbeen, Gary A., to Image Innovations, Inc. Transparent slide protective container. 4,878,073, Cl. 353-120.000.

Hopper, Roger J.; Shah, Niranjan V.; and Ryba, Steven M., to Goodyear Tire & Rubber Company, The. Process for synthesizing N,N'-dithiobis(sulfonamides). 4,877,901, Cl. 564-82.000.

Hopper, William R. Touch sensitive indicating light. 4,878,107, Cl. 357-72.000.

Horbach, Rainer: *See—*
Flaig, Heinz; Neumann, Udo; Hasselmann, Heinz; Zacharias, Karl; Horbach, Rainer; and Bitsch, Harald, 4,877,987, Cl. 310-209.000.

Hori, Hisanobu, to Matsushita Electric Industrial Co., Ltd. Margin setting means for a printer. 4,877,345, Cl. 400-342.000.

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Iemura, Ryuichi; Hori, Manabu; Ohtaka, Hiroshi; Sukamoto, Takayuki; Hara, Hideaki; and Ito, Keizo, 4,877,790, Cl. 514-260.000.

Hori, Masaaki, to Brother Kogyo Kabushiki Kaisha. Serial printer having means for controlling print head in relation to carriage movement. 4,877,343, Cl. 400-121.000.

Horiba, Ltd.: *See—*
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Horsch, Joachim, to J. I. Case Company. Hydraulic control system for a tractor transmission. 4,877,116, Cl. 192-3.570.

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Kniebel, Charles J.; Schieffer, Virgil; and Bredt, Robert C., 4,877,117, Cl. 192-85.00A.

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Morioka, Takayuki; Motoyama, Nobuyuki; Hoshikawa, Hiroshi; Takahashi, Takeo; Suzuki, Sizuo; Ishikawa, Tuyoshi; Toyoshi, Takanori; and Uede, Toshio, 4,877,558, Cl. 252-626.000.

Hosking, Jeannette T. Drinking-beaker assembly. 4,877,119, Cl. 206-459.000.

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Hosoi, Noriyuki, to Fuji Photo Film Co., Ltd. Encapsulated electrostatographic toner and method for use thereof. 4,877,708, Cl. 430-126.000.

Hosokawa, Hiroshi: *See*—
Katayama, Akihiro; Ohsawa, Hidefumi; Sunohara, Izuru; Hosokawa, Hiroshi; and Yoshimoto, Masahiko, 4,878,125, Cl. 358-443.000.
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Houki, Yoji: *See*—
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House, Wayne D.; and Myers, David J., to W. L. Gore & Associates, Inc. Rapidly recoverable PTFE and process therefore. 4,877,661, Cl. 428-34.900.
Houseman, Kenneth R.: *See*—
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Howard, Ian D.: *See*—
Edwards, D. Brandon; Edwards, Bruce W.; Howard, Ian D.; and Ives, Donald H., 4,877,316, Cl. 350-537.000.
Howell, Richard L., Jr. Augering apparatus and drilling rig. 4,877,091, Cl. 173-89.000.
Howie, Robin M., to Coal Industry (Patents) Limited. Environmental protective garment. 4,876,746, Cl. 2-69.000.
Howland, Frank S. Anti-tip wheelchair accessory. 4,877,260, Cl. 280-304.100.
Howlett, Robert E.: *See*—
Kelly, Patrick M.; Howlett, Robert E.; Pomeroy, Paul A.; and Alvarez, Dennis A., 4,876,837, Cl. 52-287.000.
Hrinda, Michael E.: *See*—
Lee, Ted C. K.; and Hrinda, Michael E., 4,877,608, Cl. 424-85.800.
Hsieh, Gerald W. Running and cycling shoe. 4,876,808, Cl. 36-131.000.
Hsieh, Ning; and Kuo, Clinton C. Single transistor cell for electrically-erasable programmable read-only memory and array thereof. 4,878,101, Cl. 357-23.500.
Hsue, Ching-Wen, to American Telephone and Telegraph Company. Method and apparatus for distributing a signal. 4,877,971, Cl. 307-11.000.
Huddleston, David A., to Nalco Chemical Company. Hydrocarbon geller and method for making the same. 4,877,894, Cl. 558-113.000.
Hudson, John L. High speed differential unit. 4,876,918, Cl. 74-650.000.
Hudson, Tom J.; McIntyre, John; Tremblay, Pierre; Allaire, Claude; and Gnyra, Bohdan, to Alcan International Limited. Linings for aluminum reduction cells. 4,877,507, Cl. 204-243.00R.
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Hughes Aircraft Company: *See*—
Wong, Joseph S., 4,878,033, Cl. 330-277.000.
Huignard, Jean P.; and Herriau, Jean P., to Thomson-CSF. Bistable optical photorefractive crystal device. 4,877,312, Cl. 350-354.000.
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Hunter, Donald W. Valve device for P.S.A. or R.P.S.A. systems. 4,877,429, Cl. 55-162.000.
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Huyer, Johannes N., to Vermeulen-Hollandia Octrooien II B.V. Open roof construction for a vehicle. 4,877,285, Cl. 296-216.000.
Huynh, Van-Minh; and Luk, Francis M., to University of Windsor. Method and apparatus for assessing surface roughness. 4,878,114, Cl. 358-106.000.
Hyde, James P., to Ford Motor Company. Tank comprising embedded flanged conduit. 4,877,147, Cl. 220-85.0VR.
Hydrocarbon Sciences, Inc.: *See*—
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Hynecek, Jaroslva, to Texas Instruments Incorporated. Image sensor array for still camera imaging with multiplexer for separating interlaced fields. 4,878,121, Cl. 358-213.220.
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Snow, Richard K.; and Ellisor, Milton W., Jr., 4,876,896, Cl. 73-827.000.
Ichihashi, Tadashi; and Kawamura, Masunori, to Kowa Company Ltd. Slit lamp microscope. 4,877,321, Cl. 351-214.000.
Ichikawa, Hiroyuki, to Canon Kabushiki Kaisha. Imgae processing apparatus. 4,878,126, Cl. 358-451.000.
Ichikawa, Kouji: *See*—
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Ide, Russell D. Piston ring. 4,877,257, Cl. 277-206.00A.
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Ieoka, Shoichi, to Olympus Optical Co., Ltd. Electronic type endoscope apparatus for use in NTSC/PAL systems. 4,878,112, Cl. 358-98.000.
Iga, Katsumi; Hamaguchi, Naoru; and Ogawa, Yasuaki, to Takeda Chemical Industries, Ltd. Method of producing liposome. 4,877,561, Cl. 264-4.300.
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Iida, Kazuyoshi: *See*—
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Bangs, Edmund R.; Longinow, Nicholas E.; and Blaha, James R., 4,877,940, Cl. 219-124.340.
Ikebe, Takashi; and Takigawa: Masuhiko, to Masuhiko Takigawa. Device for deodorizing and drying portion between toes. 4,877,018, Cl. 128-81.00R.
Ikeda Bussan Co., Ltd.: *See*—
Yamauchi, Yoshihiko, 4,877,282, Cl. 296-65.100.
Ikehira, Kimimasa; Wu, Ming-Chi; and Liu, Chih-Yuan, to Ricoh Company, Ltd.; and Industrial Technology Research Institute. Video signal mixing unit for simultaneously displaying video signals having different picture aspect ratios and resolutions. 4,878,117, Cl. 358-183.000.
Ikenaga, Osamu; and Watanabe, Susumu, to Kabushiki Kaisha Toshiba. Method for drawing a desired circuit pattern using charged particle beam. 4,878,177, Cl. 364-489.000.
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Imamura, Humihiro; and Hotta, Tomio, to Kabushiki Kaisha Toshiba. Siphon coffee maker. 4,876,953, Cl. 99-280.000.

Imamura, Shigeyuki: *See*—
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Conti-Ramsden, John N.; Powell, Richard L.; Young, Brian D.; Farrar, Jeffrey; and Brown, Debra K., 4,877,839, Cl. 525-200.000.
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Impink, Albert J., Jr.; Langford, Francis L., Jr.; Grobmyer, Louis R.; and Luinetti, William K., to Westinghouse Electric Corp. Core reactivity validation computer and method. 4,877,575, Cl. 376-216.000.
INA Walzlager Schaeffler KG: *See*—
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Inaba, Yoshiharu; and Tokunaga, Shigeo, to Fanuc Ltd. Mold clamping apparatus in an injection molding machine. 4,877,388, Cl. 425-150.000.
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Smith, Gaylord D.; Tassen, Curtis S.; Ganesan, Pasupathy; and Wheeler, Jack M., 4,877,461, Cl. 148-11.50N.
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Infanti, Vittorio, to Infanti Chair Manufacturing Corp. Rolling display table for ice sculptures and the like. 4,876,969, Cl. 108-24.000.
Inoue, Eiichi; Shimizu, Isamu; and Komatsu, Toshiyuki, to Canon Kabushiki Kaisha. Image forming member for electrophotography. 4,877,709, Cl. 430-128.000.
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Nilarp, Anders, 4,878,099, Cl. 357-71.000.
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Vince, Paul W., 4,877,659, Cl. 428-34.100.
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Nessel, Eliezer, 4,876,932, Cl. 82-158.000.
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Isoyama, Toyoshiro: *See*—
Sawada, Shinichi; Matsushita, Tetsuya; and Isoyama, Toyoshiro, 4,877,549, Cl. 252-299.630.
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Ito, Yasutoshi: *See—*
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Watahiki, Shinichi; Itoh, Nobuhiko; Ihata, Nobuo; and Miyasaka, Masao, 4,877,344, Cl. 400-124.000.

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Scholl, Wolfgang, 4,877,186, Cl. 239-75.000.

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Koyano, Tetsuo; Sagi, Nobuo; Izumi, Tsugio; Fujita, Setsuya; Murata, Tadahiko; Hachiya, Iwao; and Mori, Hiroyuki, 4,877,636, Cl. 426-607.000.

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Kakehi, Nobuo; Takahashi, Yuzuru; Higuchi, Norio; Izumihara, Yoshikazu; Matsumoto, Hiromi; and Uehori, Yuji, 4,876,874, Cl. 72-199.000.

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J. B. Two Corporation: *See—*
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J. I. Case Company: *See—*
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J.M. Huber Corporation: *See—*
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J.M. Voith GmbH: *See—*
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Bierman, Laurence W.; Lopez, Michael L.; and Perkins, James E., III, 4,877,594, Cl. 423-321.00S.

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Jackson, O. L. Extension for compacting device. 4,876,955, Cl. 100-219.000.

Jacobs, Gerardus M. H. M.; and Dinnissen, Johannes H. A., to OCE-Nederland B.V. Device for feeding and discharging originals in sheet form. 4,877,231, Cl. 271-3.100.

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Tomei, L. David; Cornhill, Fred; Jagadeesh, Jogikal; and Boninger, Michael, 4,877,966, Cl. 250-458.100.

Jagenberg Aktiengesellschaft: *See—*
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Drejer, Jorgen; and Jakobsen, Palle, 4,877,799, Cl. 514-317.000.

James, Jewell P. W. Apparatus for playing billiards or pool. 4,877,242, Cl. 273-2.000.

James, Leslie G.; and Old, Michael J., to British Nuclear Fuels Plc. Flasks for radioactive materials. 4,877,969, Cl. 250-507.100.

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Lindauer, Thomas W.; and Jamrozy, Richard E., 4,876,968, Cl. 105-415.000.

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Janik, Leon P.: *See—*
Hodgkins, David H.; and Janik, Leon P., 4,876,990, Cl. 723-41.350.

Jann, P. C.: *See—*
Chadwick, Curt H.; Sholes, Robert R.; Greene, John D.; Tucker, Francis D., III; Fein, Michael E.; Jann, P. C.; Harvey, David J.; and Bell, William, 4,877,326, Cl. 356-394.000.

Janome Sewing Machine Company Limited: *See—*
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Jansch, Manfred, to Weatherford Oil Tool GmbH. Apparatus for testing the gas-tightness of joints between hollow bodies. 4,876,884, Cl. 73-49.100.

Jansma, Donald; and Stemm, Howard W., to Bissell Health Care Corporation. Cigarette holder with filter modifier, and related method. 4,877,040, Cl. 131-189.000.

Jansson, Gunnel B.; and Holmlund, Erling S., to Pharmacia AB. Methods of carrying out assays for lipoproteins and apolipoproteins. 4,877,746, Cl. 436-518.000.

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Tsuda, Yusuke; Kurata, Takashi; Suzuki, Yoshinobu; and Yamamoto, Yuji, 4,877,835, Cl. 525-67.000.

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Jeantin, Philippe: *See—*
Delbe, Emmanuel; Gillet, Francois; Serot, Etienne; Chifflet, Raymond; Allio, Roland; Jeantin, Philippe; Del Fabro, Gilbert; and Forella, Guy, 4,877,229, Cl. 271-2.000.

Jensen, Janet R. Method and means for securing palletized materials. 4,876,841, Cl. 53-399.000.

Jensen, Niels D.; and Svarre, Erik, to Grundfos International A/S. Multi-stage rotary pump. 4,877,372, Cl. 415-199.100.

Jernigan, Thomas K.: *See—*
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JES, LP: *See—*
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Jidosha Kiki Co., Ltd.: *See—*
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Jinno, Osamu; and Fukuoka, Tatsuhiko, to Taiho Kogyo Co., Ltd. Bearing resin material. 4,877,813, Cl. 525-146.000.

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Johnsen, Stanley W.: *See—*
McIntyre, Raymond D.; and Johnsen, Stanley W., 4,877,961, Cl. 250-397.000.

Johnson, Arthur F., to Energy Conservation Partnership, Ltd. Heat regenerator to recover both sensible and heat of condensation of flue gases. 4,876,986, Cl. 122-20.00B.

Johnson, Frank M. Method of identification of rolled-up sheets of material. 4,876,809, Cl. 40-309.000.

Johnson, Howard R. Magnetic force generating method and apparatus. 4,877,983, Cl. 310-12.000.

Johnson, Todd W.; and Brizuela, Corazon C., to Minnesota Mining and Manufacturing Company. Flexible filter bag and method of fabrication. 4,877,526, Cl. 210-448.000.

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Johnston, William T. Exhaust heated trailer. 4,877,184, Cl. 237-12.30C.

Jones, Marshall G.; and Batra, Prem N., to General Electric Company. Laser debridging of microelectronic solder joints. 4,877,175, Cl. 228-102.000.

Jones, Ronald E.: *See—*
Kapuscinski, Maria M.; Grina, Larry D.; Jones, Ronald E.; and Sung, Rodney L., 4,877,415, Cl. 44-62.000.

Jones, Teddy L., to Sundstrand Corporation. Non-jamming actuator system. 4,876,906, Cl. 74-89.150.

Jos. Hunkeler Ltd.: *See—*
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Jung, Peter: *See—*
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Jungwirth, Dieter: *See—*
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Andersson, Lars-Olof; Forsman, Nanna; Larsen, Kerstin E. I.; Lundin, Annelie B.; Pavlu, Bohdan; Sandberg, Inga H.; and Sewerin, Karin M., 4,877,614, Cl. 424-101.000.

Kabushiki Kaisha Asahi Kinzoku Kogyosho: *See*—
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Kabushiki Kaisha Daikin Seisakusho: *See*—
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Kabushiki Kaisha Honda Rokku: *See*—
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Tanaka, Hiroshi; Murata, Yasukiyo; and Eto, Kazumi, 4,876,861, Cl. 62-279.000.
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Kabushikikiaisha Kibun: *See*—
Kiuchi, Hiroshi; Murata, Katsumi; Murakami, Kazuo; Kusakabe, Isao; and Kobayashi, Hideyuki, 4,877,622, Cl. 426-46.000.

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Kaczmarek, Richard, to Reliance Comm/Tec Corporation. Line protector. 4,878,146, Cl. 361-119.000.

Kade, Werner; and Rahmig, Hermann, to J.M. Voith GmbH. Headbox for paper machine with hollow expanding member for profile bar adjustment. 4,877,486, Cl. 162-336.000.

Kaeriyama, Kyoji: *See*—
Tanaka, Susumu; Sato, Masaaki; Kaeriyama, Kyoji; Suda, Yoshio; and Hiraide, Takao, 4,877,852, Cl. 526-256.000.

Kah, Carl L. C., Jr. Multi-voltage motor and timer clock. 4,878,006, Cl. 318-770.000.

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Kaiser Aerospace & Electronics Corporation: *See*—
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Kaiser, Carl: *See*—
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Kakehi, Nobuo; Takahashi, Yuzuru; Higuchi, Norio; Izumihara, Yoshikazu; Matsumoto, Hiromi; and Uehori, Yuji, to Nippon Steel Corporation. Method of hot rolling steel strip with deformed sections. 4,876,874, Cl. 72-199.000.

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Kalain, Terry M.: *See*—
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Kalal, Theodore T.; and Kowitch, Richard, to Cooper Power Systems, Inc. Line current to time interpolator. 4,878,143, Cl. 361-94.000.

Kalamazoo Holdings, Inc.: *See*—
Todd, Paul H., Jr., 4,877,635, Cl. 426-542.000.

Kalatozishvili, Elena I.: *See*—
Mudzhiri, Levan A.; Alkhazashvili, Gia G.; Kalatozishvili, Elena I.; Chekurishvili, Gia O.; Brekhman, Izrail I.; Bulanov, Alexandr E.; and Polozhentseva, Mira I., 4,877,772, Cl. 514-23.000.

Kalmanash, Michael H., to Kaiser Aerospace & Electronics Corporation. Stereoscopic display. 4,877,307, Cl. 350-132.000.

Kaluschke, Thomas: *See*—
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Kambe, Shigemitsu; and Miyafuzi, Hideaki, to Nippon Petrochemicals Company, Limited. Ethylenic thermoplastic resin composition. 4,877,663, Cl. 428-35.500.

Kamiya, Akihiko: *See*—
Aoai, Toshiaki; Maemoto, Kazuo; Kamiya, Akihiko; and Misu, Hiroshi, 4,877,711, Cl. 430-176.000.

Kampe, Klaus-Dieter; Raether, Wolfgang; and Dittmar, Walter, to Hoechst Aktiengesellschaft. 2-azolylmethyl-2-aryl-1,3-dioxolanes and the salts thereof, processes for the preparation thereof, agents containing same, and the use thereof. 4,877,878, Cl. 544-368.000.

Kanamaru, Tatsuya; Nakayama, Motohiro; Arai, Katutoshi; Suzuki, Shinichi; and Naka, Ryoichi, to Nippon Steel Corporation. Corrosion resistant plated steel strip and method for producing same. 4,877,494, Cl. 204-28.000.

Kanamori, Iwao, to Olympus Optical Co., Ltd. Objective lens system for endoscopes. 4,877,314, Cl. 350-422.000.

Kanebo Limited: *See*—
Iemura, Ryuichi; Hori, Manabu; Ohtaka, Hiroshi; Sukamoto, Takayuki; Hara, Hideaki; and Ito, Keizo, 4,877,790, Cl. 514-260.000.
Kiyohara, Kazuto; Hagiwara, Toshiyuki; Nakadate, Takanori; Harada, Ichiya; Noguchi, Kentaro; Sakae, Shigeru; and Okuma, Kazuhiro, 4,877,819, Cl. 523-200.000.

Kaneko, Ichiro: *See*—
Kobayashi, Kenji; Kaneko, Ichiro; Kobayashi, Masahiro; and Nakano, Shinji, 4,877,535, Cl. 210-701.000.

Kaneko, Toshio, to Kabushiki Kaisha Asahi Kinzoku Kogyosho. Method and apparatus for manufacturing curved pipe. 4,876,872, Cl. 72-133.000.

Kaneshige, Ryousuke; and Mizui, Kinya, to Mitsui Petrochemical Industries, Ltd. Lubricating oil composition. 4,877,557, Cl. 252-56.00S.

Kanno, Kimio, to Toyoda Iron Works Co., Ltd. Parking-brake operating device. 4,876,914, Cl. 74-538.000.

Kansai Paint Company, Ltd.: *See*—
Maeda, Shigeyoshi; Asai, Tsunetoshi; Asano, Hidejiro; and Taguchi, Haruyoshi, 4,877,664, Cl. 428-35.900.

Kansas State University Research Foundation: *See*—
Klabunde, Kenneth J., 4,877,647, Cl. 427-123.000.

Kantor, Edward A.; Berci, George; and Storz, Karl. Video endoscopic microscope. 4,877,016, Cl. 128-6.000.

Kao, Heng-er Y. Engineering constructive load cell. 4,876,895, Cl. 73-761.000.

Kaper, Louris; Klamer, Roelof; and Noomer, Pieter J., to Douwe Egberts Koninklijke Tabaksfabriek-Koffiebranderijen-Theehandel N.V. Process for recovering caffeine absorbed in activated carbon, and a process for decaffeinating coffee. 4,877,631, Cl. 426-422.000.

Kappes, Kenneth C., to Milprint, Inc. Direct overwrap for bar soap. 4,877,674, Cl. 428-192.000.

Kapulka, Kenneth M.; Rader, Holly A.; and Strickland, Jimmy P., to International Business Machines Corporation. Method for managing reuse of hard log space by mapping log data during state changes and discarding the log data. 4,878,167, Cl. 364-200.000.

Kapuscinski, Maria M.; Grina, Larry D.; Jones, Ronald E.; and Sung, Rodney L., to Texaco Inc. Hydrocarbon compositions containing polyolefin graft polymers. 4,877,415, Cl. 44-62.000.

Kar, Gitimoy, to Corning Glass Works. Coated optical waveguide fibers. 4,877,306, Cl. 350-96.330.

Karasaki, Toshihiko: *See*—
Hamada, Masataka; Karasaki, Toshihiko; Matsui, Toru; and Makawa, Yukio, 4,878,079, Cl. 354-402.000.
Taniguchi, Nobuyuki; Karasaki, Toshihiko; Mukai, Hiromu; Tokumaru, Hisashi; and Ishida, Tokuji, 4,878,076, Cl. 354-286.000.

Karhu-Titan Oy: *See*—
Tiitola, Antti-Jussi; and Pohja, Kari, 4,876,807, Cl. 36-114.000.

Karita, Mitsuji, to Shinko Electric Co., Ltd. Door apparatus with magnetic support. 4,876,765, Cl. 16-102.000.

Karna, Juhani; and Pahlman, Heikki, to Sunds Defibrator Jylha Oy. Method and device for measuring the distance between the discs of a refiner using a measurement of the magnetic flux induced between the discs. 4,878,020, Cl. 324-207.000.

Karpuk, Michael E.; and Cowley, Scott W., to Technology Development Associates, Inc. Enhanced performance of alcohol fueled engine during cold conditions. 4,876,989, Cl. 123-3.000.

Karsai, Jozsef: *See*—
Neu Jozsef; Csatlos, Imre; Varga, Andras; Suranyi, Robert; Ilovai, Zoltan; Gaal, Sandor; Karsai, Jozsef; Sebestyen, Endre; Gardi, Eva; Siki, Karoly; Toth, Istvan; Gal, Guszt/e,acu/a/ v; Dombay, Zsolt; Grega nee Toth, Mrs. Erzsebet; Pavliscsak, Csaba; Tarpai, Gyula; Bonnyay, Peter; and Santha, Pal, 4,877,893, Cl. 558-86.000.

Kasahara, Yoshiki, to Yamaha Corporation. Remote control device. 4,878,055, Cl. 341-23.000.

Kasai, Masaji: *See*—
Murakata, Chikara; Sato, Akira; Kasai, Masaji; Kobayashi, Eiji; Morimoto, Makoto; and Akinaga, Shiro, 4,877,776, Cl. 514-43.000.

Kasanami, Tohru: *See*—
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Kashida, Motokazu: *See*—
Masui, Toshiyuki; Kashida, Motokazu; Takahashi, Koji; and Nagasawa, Kenichi, 4,878,134, Cl. 360-77.150.

Kashimura, Noboru: *See*—
Hiro, Masaaki; Kimura, Tomohiro; Tanaka, Hisami; Kashimura, Noboru; Tanaka, Shigemori; Tohma, Hitoshi; and Hisamura, Masafumi, 4,877,701, Cl. 430-59.000.

Kashiwada, Minoru: *See*—
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Kashiwagi, Masato: *See*—
Tamaru, Sinji; Kubo, Motonobu; and Kashiwagi, Masato, 4,877,859, Cl. 528-129.000.

Kashiwazaki, Tomoyuki: *See*—
Okawa, Kazuyoshi; Moriya, Kazumasa; Kashiwazaki, Tomoyuki; Kawashima, Hiroshi; and Murakawa, Yoshitaka, 4,876,966, Cl. 104-290.000.

Kasner, Clayton S., to Design Improvement Corporation. Drain valve device. 4,877,218, Cl. 251-61.300.

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Suzuki, Hiroaki; Kataoka, Yoshiyuki; Murase, Michio; Inoue, Kotaro; Sumida, Isao; Yamanari, Shozo; Matsumoto, Masaki; Miura, Satoshi; and Hashimoto, Koji, 4,877,574, Cl. 376-216.000.

Katayama, Aiichi: *See*—
Nakatsugawa, Kenji; Katayama, Aiichi; and Sekiya, Hitoshi, 4,878,194, Cl. 364-900.000.

Katayama, Akihiro; Ohsawa, Hidefumi; Sunohara, Izuru; Hosokawa, Hiroshi; and Yoshimoto, Masahiko, to Canon Kabushiki Kaisha. Method and apparatus for image processing with fed-back error correction. 4,878,125, Cl. 358-443.000.

Katerberg, James A., to Eastman Kodak Company. Multicolor printing apparatus and method having vernier detection/correction system for adjusting color separation planes. 4,878,063, Cl. 346-1.100.

Katerberg, James A.; Wint, Robert L.; and Lewis, Richard A., to Eastman Kodak Company. Continuous ink jet stimulation adjustment based on overdrive detection. 4,878,064, Cl. 346-75.000.

Kato, Satoshi: *See*—
Aiki, Shigetaka; Kobayashi, Kiyonori; and Kato, Satoshi, 4,876,917, Cl. 74-574.000.

Kato, Toyoji: *See*—
Hayashi, Yoshiaki; Itakura, Takeshi; Kato, Toyoji; and Koshidaka, Yukio, 4,877,141, Cl. 215-1.00C.

Kato, Yukihiro; Ishii, Masami; Yabuno, Ryohei; and Oka, Tetsuo, to Aisin Seiki Kabushiki Kaisha. Strain gauges for the pressure sensor. 4,876,893, Cl. 73-726.000.

Katsumata, Yukio: *See*—
Miike, Akira; Katsumata, Yukio; and Tatano, Toshio, 4,877,727, Cl. 435-24.000.

Katzenstein, Henry S.: *See*—
Dandliker, Walter B.; Barr, Howard S.; Katzenstein, Henry S.; and Watson, Keith R., 4,877,965, Cl. 250-458.100.

Kaufman, Charles W.; Kempf, Mark F.; and Hutchison, Jerry D., to Digital Equipment Corporation. Method and apparatus for nodes in network to avoid shrinkage of an interframe gap. 4,878,219, Cl. 370-97.000.

Kaufman, Frank B.: *See*—
Moore, James A.; Dasheff, Andrew N.; and Kaufman, Frank B., 4,877,718, Cl. 430-326.000.

Kausch, Michael; Buysch, Hans-Josef; Schroer, Hans; and Suling, Carlhans, to Bayer Akteingesellschaft. Elasthane fibers stabilized against environmental influences. 4,877,825, Cl. 524-101.000.

Kavesh, Sheldon; Prevorsek, Dusan C.; and Harpell, Gary A., to Allied-Signal Inc. Method for preparing heat set fabrics. 4,876,774, Cl. 28-166.000.

Kawada, Kazuhide, to NEC Corporation. Microcomputer having Z-flag capable of detecting coincidence at high speed. 4,878,189, Cl. 364-736.500.

Kawai, Hiroyuki; and Nakagawa, Shinichi, to Mitsubishi Denki Kabushiki Kaisha. Clock generator which generates a non-overlap clock having fixed pulse width and changeable frequency. 4,877,974, Cl. 307-269.000.

Kawai, Hiroyuki: *See*—
Umezawa, Hamao, deceased; Tatsuta, Kuniaki; Kawai, Hiroyuki; and Nakajima, Shohachi, 4,877,870, Cl. 536-6.400.

Kawai, Kenji: *See*—
Ogawa, Toshiaki; Fujiwara, Nobuo; Kawai, Kenji; Shibano, Teruo; Morita, Hiroshi; and Nishioka, Kyusaku, 4,877,509, Cl. 204-298.000.

Kawamoto, Haruki: *See*—
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Kawamura, Ken: *See*—
Shirai, Koji; and Kawamura, Ken, 4,878,096, Cl. 357-42.000.

Kawamura, Masunori: *See*—
Ichihashi, Tadashi; and Kawamura, Masunori, 4,877,321, Cl. 351-214.000.

Kawamura, Shuzo, to Murata Kikai Kabushiki Kaisha. Package inspecting apparatus. 4,877,967, Cl. 250-461.100.

Kawano, Minoru; Simizu, Katsumi; Isonaga, Eiji; and Kurata, Shigeo, to Ube Indrustries, Ltd. Process for producing N-aminohexamethyleneimine. 4,877,874, Cl. 540-606.000.

Kawasaki Jukogyo Kabushiki Kaisha: *See*—
Tatebayashi, June; Takada, Tomoaki; Hayashi, Kimitaka; and Kumagai, Chikanori, 4,877,397, Cl. 432-106.000.

Kawasato, Takayuki: *See*—
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Kawase, Toshihiro; and Sano, Sachiya, to Kabushiki Kaisha Tokai Rika Denki Seisakusho. Switch having a visable indicator. 4,877,931, Cl. 200-308.000.

Kawashima, Hiroshi: *See*—
Okawa, Kazuyoshi; Moriya, Kazumasa; Kashiwazaki, Tomoyuki; Kawashima, Hiroshi; and Murakawa, Yoshitaka, 4,876,966, Cl. 104-290.000.

Kawate, Keith W.: *See*—
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Kay Chemical Company: *See*—
Cockrell, John R., Jr.; and Thekkekandam, Joseph T., 4,877,459, Cl. 134-40.000.
Cockrell, John R., Jr., 4,877,691, Cl. 428-688.000.

Kazan, Benjamin; and Hagstrom, Stig B. M., to Xerox Corporation. System for recording and readout of information at atomic scale densities and method therefor. 4,878,213, Cl. 369-126.000.

KDC Corporation: *See*—
Kompanek, Harry W.; and Ming, Rickey H., 4,878,057, Cl. 341-34.000.

Kearfott Guidance & Navigation Corporation: *See*—
Shernoff, Donald I., 4,877,311, Cl. 356-350.000.

Keck, Rick W.: *See*—
Morgan, Alan R.; Selman, Steven H.; Garbo, Greta M.; and Keck, Rick W., 4,877,872, Cl. 540-145.000.

Keene, Donna L.; and Hicks, Darrell D., to Hoechst Celanese Corporation. Poly(epoxide) coatings containing a mannich base of a hydroxystyrene containing polymer. 4,877,502, Cl. 204-181.700.

Kegal, Thomas M.: *See*—
DeCarlo, Joseph P.; and Kegal, Thomas M., 4,876,897, Cl. 73-861.040.

Keho Alta Industries Ltd.: *See*—
Gullickson, Zan, 4,877,090, Cl. 172-102.000.

Keller, Dennis J.: *See*—
Hall, Dale R.; and Keller, Dennis J., 4,877,856, Cl. 528-44.790.

Keller, James B.: *See*—
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Kelley, James L.: *See*—
Volpe, James R.; and Kelley, James L., 4,877,292, Cl. 297-440.000.

Kelley, James O.; Stumpf, William E.; and Friedman, Frank A., to Herman Miller, Inc. Work space management system. 4,876,835, Cl. 52-239.000.

Kelley, William L. Motor vehicle remote control system. 4,878,050, Cl. 340-825.060.

Kelly, Patrick M.; Howlett, Robert E.; Pomeroy, Paul A.; and Alvarez, Dennis A., to USG Interiors, Inc. Corner bead structure. 4,876,837, Cl. 52-287.000.

Kempf, Mark F.: *See*—
Kaufman, Charles W.; Kempf, Mark F.; and Hutchison, Jerry D., 4,878,219, Cl. 370-97.000.

Kendall Company, The: *See*—
Charkoudian, John C., 4,877,454, Cl. 106-131.000.

Kenealy, Dean R.; and Aittama, Robert W., to Ford Motor Company. Fuel vapor recovery system. 4,877,001, Cl. 123-519.000.

Kennard, Edsel, Jr. Support for mixer buckets. 4,877,208, Cl. 248-146.000.

Kenny, Brian P.; and Bowles, Roger A., to Tillotson Ltd. Carburetor and valve mechanism. 4,877,560, Cl. 261-35.000.

Keoshkerian, Barkev: *See*—
Winnik, Francoise M.; and Keoshkerian, Barkev, 4,877,451, Cl. 106-23.000.

Kerdix, Inc.: *See*—
Muchnik, Boris J.; and Fischer, Bernd F., 4,877,666, Cl. 428-64.000.

Kern & Co. AG: *See*—
Hauri, Bernhard; and Etter, Hans, 4,877,324, Cl. 356-251.000.

Kerr Machinery Corporation: *See*—
Putt, Francis G., 4,877,371, Cl. 415-169.100.

Kesling, Peter C., to TP Orthodontics, Inc. Bracket for permitting tipping and limiting uprighting. 4,877,398, Cl. 433-8.000.

Khanna, Dinesh N.: *See*—
Vora, Rohitkumar H.; Khanna, Dinesh N.; and Fontaine, Suzanne, 4,877,653, Cl. 427-385.500.

Khinkis, Mark J., to Institute of Gas Technology. Vertical shaft melting furnace and method of melting. 4,877,449, Cl. 75-20.00R.

Kikuchi, Shoji: *See*—
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Kikuchi, Takashi: *See*—
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Kilper, John J., to Alvey, Inc. Chain lubricator. 4,877,111, Cl. 184-15.100.

Kim, Myun H. Container with an opening device comprising a guide strip and tear band. 4,877,139, Cl. 206-617.000.

Kimball, John: *See*—
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Kimbrell, William C., Jr.: *See*—
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Kimura, Kiyoshi; Ogasawara, Takashi; and Mushiroi, Takeshi, to Nippon Shinyaku Co., Ltd. Histidylprolineamide derivatives. 4,877,784, Cl. 514-227.800.
Kimura, Norio: *See*—
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Kimura, Tomohiro: *See*—
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Kinast, Robert A.: *See*—
Andros, Andrew A.; Campana, Thomas J., Jr.; Thelen, Gary F.; and Kinast, Robert A., 4,878,051, Cl. 340-825.440.
Kindler, George U. P.: *See*—
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Kinoshita, Mikio; Ohta, Wasaburo; and Miyabori, Toru, to Ricoh Company, Ltd. Apparatus for forming a thin film. 4,876,984, Cl. 118-723.000.
Kinsman, Grant: *See*—
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Kirin Beer Kabushiki Kaisha: *See*—
Umezawa, Hamao, deceased; Tatsuta, Kuniaki; Kawai, Hiroyuki; and Nakajima, Shohachi, 4,877,870, Cl. 536-6.400.
Kirjanov, Alexander S.; and Herlant, Michel A., to Crompton & Knowles Corporation. Sulfomethylated stain blocking agents. 4,877,538, Cl. 252-8.700.
Kishi, Noriyuki: *See*—
Otobe, Yutaka; and Kishi, Noriyuki, 4,876,995, Cl. 123-90.120.
Kishida, Daisuke; and Sasaki, Saburo, to Ricoh Company, Ltd. Exposure control device for a camera. 4,878,081, Cl. 354-414.000.
Kishida, Kazuo; Toyooka, Yutaka; and Mikami, Yoshiyuki, to Mitsubishi Rayon Company Limited. Process for producing a low gloss thermoplastic resin. 4,877,844, Cl. 525-316.000.
Kishimoto, Satoshi: *See*—
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Kitamoto, Manabu, to Kabushiki Kaisha Toshiba. Multi-type air conditioner system with starting control for parallel operated compressors therein. 4,876,859, Cl. 62-117.000.
Kitano, Kisei; Ushioda, Makoto; Uchida, Manabu; and Suzuki, Toshiharu, to Chisso Corporation. Liquid crystal composition. 4,877,548, Cl. 252-299.630.
Kiuchi, Hiroshi; Murata, Katsumi; Murakami, Kazuo; Kusakabe, Isao; and Kobayashi, Hideyuki, to Kabushikikiaisha Kibun; and Kabushikikiaisha Kibun Foodchemifa. Process for producing food material. 4,877,622, Cl. 426-46.000.
Kiya, Nobuyuki; and Maeda, Kimio, to Fanuc Ltd. Numerical control method for machining an arc on the curved surface of a cylinder using interpolation of linear and angular data. 4,878,171, Cl. 364-474.290.
Kiyohara, Kazuto; Hagiwara, Toshiyuki; Nakadate, Takanori; Harada, Ichiya; Noguchi, Kentaro; Sakae, Shigeru; and Okuma, Kazuhiro, to Konica Corporation; and Kanebo Ltd. Process for producing polyester resin composition. 4,877,819, Cl. 523-200.000.
Kiyohara, Takehiko, to Canon Kabushiki Kaisha. Ink jet recording apparatus with an ink tank-carriage configuration for increasing useable space. 4,878,069, Cl. 346-140.00R.
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Klabunde, Kenneth J., to Kansas State University Research Foundation. Method of coating substrates with solvated clusters of metal particles. 4,877,647, Cl. 427-123.000.
Klamer, Roelof: *See*—
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Klemann, Lawrence P.; Finley, John W.; and Scimone, Anthony, to Nabisco Brands, Inc. Synthesis of sucrose polyester. 4,877,871, Cl. 536-124.000.
Klenter, Otto; and Burk, Klaus, to Hoechst Aktiengesellschaft. End wall of moldable material for a wound roll. 4,877,133, Cl. 206-416.000.
Kliene, Ronald Ian: *See*—
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Kligman, Albert M. Methods for treatment of sundamaged human skin with retinoids. 4,877,805, Cl. 514-381.000.
Klingels, Hermann, to MTU Motoren- und Turbinen-Union Munchen GmbH. Gas turbine propulsion unit with a gas generator. 4,876,849, Cl. 60-39.161.
Klingle, Reinhard; and Manner, Reinhard, to Degussa Aktiengesellschaft. Method of compressing pyrogenically prepared silicic acid. 4,877,595, Cl. 423-335.000.
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Knapp, Gunter; and Schalk, Andreas, to Anton Paar KG. Method and apparatus for producing an hf-induced noble-gas plasma. 4,877,999, Cl. 315-248.000.
Knapp, James H.; Carney, George F.; and Carney, Francis J., to Motorola Inc. Nitride removal method. 4,877,482, Cl. 156-643.000.
Knepper, Hans-Reinhard. Process and installation for the automatic control of a utility vehicle. 4,878,003, Cl. 318-587.000.
Kniebel, Charles J.; Schieffer, Virgil; and Bredt, Robert C., to Horton Industries, Inc. Rotational control apparatus. 4,877,117, Cl. 192-85.00A.
Knuchel, Pierre; and Nollez, Jacques, to Bendix France. Leakage device for the drainage of a diaphragm accumulator. 4,877,055, Cl. 137-568.000.
Knudsen, Christian W.: *See*—
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Ko, Kenneth K.: *See*—
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Ko, Su-sen; and Fanselow, Dan L., to Minnesota Mining and Manufacturing Company. Tissue or mucus sampling device. 4,877,037, Cl. 128-756.000.
Ko, Yer-Lee. Process for improving the color of prawns, shrimp and lobsters. 4,877,633, Cl. 426-506.000.
Kobayashi, Eiji: *See*—
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Kobayashi, Ichiji; and Sakata, Motohide, to Mizota Industrial Co., Ltd. Pumping system for gates. 4,877,537, Cl. 210-747.000.
Kobayashi, Jyunichi, to Hitachi, Ltd. Soldered structure of fine wire, and method of and apparatus for soldering fine wire. 4,877,936, Cl. 219-85.220.
Kobayashi, Kazuhiko: *See*—
Okudaira, Shigenori; Irie, Takefumi; Uchida, Hiroshi; Fukasawa, Eiichi; Kobayashi, Kazuhiko; and Yamaguchi, Masanori, 4,877,445, Cl. 75-0.50B.
Kobayashi, Kenji; Kaneko, Ichiro; Kobayashi, Masahiro; and Nakano, Shinji, to Kurita Water Industries, Ltd.; and Otsuka Chemical Co., Ltd. Iron dispersant for boiler water. 4,877,535, Cl. 210-701.000.
Kobayashi, Kiyonori: *See*—
Aiki, Shigetaka; Kobayashi, Kiyonori; and Kato, Satoshi, 4,876,917, Cl. 74-574.000.
Kobayashi, Masahiro: *See*—
Kobayashi, Kenji; Kaneko, Ichiro; Kobayashi, Masahiro; and Nakano, Shinji, 4,877,535, Cl. 210-701.000.
Kobayashi, Mitsuo, to Nippo Kabushiki Kaisha. Document stand. 4,877,212, Cl. 248-444.100.
Kobayashi, Shigetoshi, to Clarion Co., Ltd. Multi-stage push button switch device. 4,877,925, Cl. 200-5.00A.
Koch, Donald E.: *See*—
Gottesman, Jeffrey L.; Dempsky, Mark A.; Koch, Donald E.; and Rattan, Dev R., 4,878,048, Cl. 340-825.010.
Koch, Heinz: *See*—
Alt, Claus-Christian; Gobel, Rudolf; Koch, Heinz; Niechoj, Wolfgang; Grossmann, Theodor; and Deffner, Felix, 4,877,258, Cl. 277-212.0FB.
Koch, Horst; and Ziegler, Walter, to BASF Aktiengesellschaft. Light sensitive recording element having a photopolymerizable relief-form-

ing layer containing an ethylene terpolymer. 4,877,715, Cl. 430-271.000.
Koch, Paul H. Fiber optic christmas tree. 4,878,157, Cl. 362-123.000.
Koch, Wolfgang: *See*—
Schwirtlich, Ingo; Woditsch, Peter; and Koch, Wolfgang, 4,877,596, Cl. 423-348.000.
Kochi, Hiromu: *See*—
Takaya, Takao; Masugi, Takashi; Takasugi, Hisashi; and Kochi, Hiromu, 4,877,873, Cl. 544-227.000.
Kodama, Akinori; and Takahashi, Takeshi, to Showa Denko Kabushiki Kaisha. Scored container top. 4,877,149, Cl. 220-267.000.
Kodama, Shinya: *See*—
Ishida, Kyoso; and Kodama, Shinya, 4,876,876, Cl. 72-348.000.
Kohda, Toichi: *See*—
Yatsuda, Hiromi; Takeuchi, Yoshihiko; Kohda, Toichi; and Yoshikawa, Shokichiro, 4,878,036, Cl. 333-195.000.
Kohler, Tilmann L. Fluid dispensing apparatus. 4,877,158, Cl. 222-400.800.
Kohler, Uwe: *See*—
Mayer, Ernst; Geheeb, Norbert; and Kohler, Uwe, 4,876,996, Cl. 123-90.510.
Kohne, Bernd: *See*—
Praefcke, Klaus; Kohne, Bernd; and Stephan, Werner, 4,877,220, Cl. 252-299.610.
Kohshin Seimitsu Kikai Kabushiki Gaisha: *See*—
Ando, Manabu, 4,876,974, Cl. 112-240.000.
Koike, Yuzuru: *See*—
Noguchi, Kunio; Koike, Yuzuru; and Toshimits, Kazushige, 4,877,006, Cl. 123-589.000.
Koishi, Tetsuo: *See*—
Tanigawa, Motoshi; Dohi, Hidehiko; Nishimura, Takashi; Ichikawa, Kouji; and Koishi, Tetsuo, 4,877,071, Cl. 152-165.000.
Koji, Ito: *See*—
Toshio, Kamimura; and Koji, Ito, 4,877,052, Cl. 137-512.300.
Kokado, Masayuki, to Fujitsu Limited. ECL circuit having an improved emitter follower output circuit. 4,877,977, Cl. 307-455.000.
Kolacek, Ivo. Adjustable stop member. 4,877,359, Cl. 409-218.000.
Komatsu, Toshiyuki: *See*—
Inoue, Eiichi; Shimizu, Isamu; and Komatsu, Toshiyuki, 4,877,709, Cl. 430-128.000.
Komenou, Kazunari: *See*—
Suzuki, Toshihiro; Todokoro, Yasuyuki; and Komenou, Kazunari, 4,877,717, Cl. 430-321.000.
Komori, Akihiro; and Hirano, Muneyoshi, to Yoshida Kogyo K. K. Screen unit with built-in blind. 4,877,076, Cl. 160-107.000.
Komori, Hideo: *See*—
Yarita, Takao; Komori, Hideo; Ogasawara, Koji; and Takami, Hiroaki, 4,877,061, Cl. 139-224.00R.
Kompanek, Harry W.; and Ming, Rickey H., to KDC Corporation. Typewriter keyboard. 4,878,057, Cl. 341-34.000.
Kondo, Asaji: *See*—
Yazawa, Kenichiro; Seshimoto, Osamu; Kitajima, Masao; and Kondo, Asaji, 4,877,579, Cl. 422-56.000.
Kondo, Masatsune; Ogura, Kiyoshi; and Kuramoto, Koiti, to Sumitomo Naugatuck Co., Ltd. Heat resistant copolymer composition. 4,877,833, Cl. 525-64.000.
Konica Corporation: *See*—
Kiyohara, Kazuto; Hagiwara, Toshiyuki; Nakadate, Takanori; Harada, Ichiya; Noguchi, Kentaro; Sakae, Shigeru; and Okuma, Kazuhiro, 4,877,819, Cl. 523-200.000.
Morita, Shizuo; Hayakawa, Kazushi; Ito, Kunio; Matsuo, Shunji; Fukuchi, Masakazu; and Hatakeyama, Noboru, 4,878,091, Cl. 355-260.000.
Konishi, Junkichi; and Shiraishi, Yasuhiro, to Nissan Motor Company, Limited. Height control system in automotive suspension system with feature of capability of height adjustment in lock condition of drive wheel and power train. 4,877,263, Cl. 280-707.000.
Konishi, Motofumi: *See*—
Kotera, Masahide; Konishi, Motofumi; Ando, Yoshio; Iwaya, Toshio; Tanaka, Kanou; Hashimoto, Norio; Sugita, Yasutoshi; Sano, Yoshitaka; and Ono, Satoshi, 4,878,250, Cl. 382-56.000.
Konishiroku Photo Industry Co., Ltd.: *See*—
Maruyama, Hiroyuki; Kishimoto, Tadao; Isobe, Toshifumi; and Yokobori, Jun, 4,878,110, Cl. 358-75.000.
Takagiwa, Hiroyuki; Takahashi, Jiro; Shirose, Meizo; Akimoto, Kunio; and Uchida, Masafumi, 4,877,704, Cl. 430-99.000.
Kono, Shunzo: *See*—
Sakaki, Mamoru; Arai, Ryuichi; Akiya, Takashi; Toganoh, Shigeo; Higuma, Masahiko; Eto, Naonobu; Mouri, Hidemasa; Tobita, Michiaki; Ishida, Masahiko; and Kono, Shunzo, 4,877,680, Cl. 428-332.000.
Kopainsky, Jurgen: *See*—
Brand, Klaus-Peter; Kopainsky, Jurgen; and Wittwer, Fritz, 4,878,185, Cl. 364-572.000.
Kopmels, Pieter J. M.: *See*—
van Calker, Freerk R.; Kopmels, Pieter J. M.; and Ter Burg, Antonius W. M., 4,877,126, Cl. 198-847.000.
Korn, Darryl K.: *See*—
Nay, Daniel L.; Korn, Darryl K.; and Ralph, John T., 4,878,197, Cl. 364-900.000.
Koromilas, Constantinos A., to General Motors Corporation. Positive displacement rotary mechanism. 4,877,385, Cl. 418-197.000.
Korotky, Steven K.: *See*—
Halemane, Thirumala R.; and Korotky, Steven K., 4,877,952, Cl. 250-213.00A.
Koshidaka, Yukio: *See*—
Hayashi, Yoshiaki; Itakura, Takeshi; Kato, Toyoji; and Koshidaka, Yukio, 4,877,141, Cl. 215-1.00C.
Koshimo, Masahiko, to Kabushiki Kaisha Daikin Seisakusho. Stepless speed-change power transmission for vehicle. 4,876,922, Cl. 74-731.000.
Koshy, K. Thomas: *See*—
Cazers, Alexander R.; and Koshy, K. Thomas, 4,877,782, Cl. 514-186.000.
Koslowski, Gunter; and Uttscheid, Georg, to ROFA Rosenheimer Forderanlagen GmbH. Device for the centering of a rail in elevator stations of electric overhead trolley conveyors. 4,876,965, Cl. 104-127.000.
Kostlan, Catherine R.: *See*—
Belliotti, Thomas R; Connor, David T.; Flynn, Daniel L.; Kostlan, Catherine R.; and Nies, Donald E., 4,877,881, Cl. 548-240.000.
Kotera, Masahide; Konishi, Motofumi; Ando, Yoshio; Iwaya, Toshio; Tanaka, Kanou; Hashimoto, Norio; Sugita, Yasutoshi; Sano, Yoshitaka; and Ono, Satoshi, to Canon Kabushiki Kaisha. Image processing system. 4,878,250, Cl. 382-56.000.
Kothe, Norbert: *See*—
Rudnick, Dieter; Kothe, Norbert; Dichtelmuller, Herbert; Piechaczek, Detlef; Stephan, Wolfgang; and Schleussner, Hans, 4,877,866, Cl. 530-387.000.
Kouchi, Toshihito: *See*—
Okada, Takao; Kouchi, Toshihito; Mishima, Shuzo; Ogawa, Haruo; Morita, Seizo; and Mikoshiba, Nobuo, 4,877,957, Cl. 250-306.000.
Kouno, Kenzi: *See*—
Masu, Masanobu; Yoshioka, Hiroshi; Kouno, Kenzi; Nomura, Isao; and Yamamiya, Kazuo, 4,877,847, Cl. 525-397.000.
Kovacs, Marta: *See*—
Nagy, Gabor; Neumann, Gyorgy; Kovacs, Marta; and Strompl, Andras, 4,877,199, Cl. 242-201.000.
Koval, Vernon E.: *See*—
Helm, Charles W.; and Koval, Vernon E., 4,877,092, Cl. 175-74.000.
Kowa Company Ltd.: *See*—
Ichihashi, Tadashi; and Kawamura, Masunori, 4,877,321, Cl. 351-214.000.
Kowitch, Richard: *See*—
Kalal, Theodore T.; and Kowitch, Richard, 4,878,143, Cl. 361-94.000.
Koyama, Hiroyasu: *See*—
Satoh, Hiroaki; Koyama, Hiroyasu; Suzuki, Yoshikuni; Sugai, Toshiji; and Watanabe, Koichi, 4,877,797, Cl. 514-314.000.
Koyama, Masataka, to Victor Company of Japan, Ltd. Solid-phase welded magnetic head. 4,878,141, Cl. 360-120.000.
Koyama, Takeshi; Ohtaka, Keiji; and Suda, Yasuo, to Canon Kabushiki Kaisha. Focus detecting device and method of making same. 4,878,078, Cl. 354-402.000.
Koyano, Tetsuo; Sagi, Nobuo; Izumi, Tsugio; Fujita, Setsuya; Murata, Tadahiko; Hachiya, Iwao; and Mori, Hiroyuki, to Meiji Seika Kaisha, Ltd.; and Fuji Oil Company, Limited. Chocolate and chocolate additive. 4,877,636, Cl. 426-607.000.
Kozak, Burton. Portable screw driver having flexible extension shaft. 4,876,929, Cl. 81-57.430.
Kozikowski, Barbara A.: *See*—
Degenhardt, Charles R.; and Kozikowski, Barbara A., 4,877,603, Cl. 424-57.000.
Kozuki, Susumu: *See*—
Yasumura, Hiroto; Hirasawa, Masahide; Noji, Minoru; Kozuki, Susumu; Takahashi, Koji; Yoshimura, Katsuji; and Sasatani, Tomohiko, 4,878,128, Cl. 358-315.000.
Kraemer, Carolyn, to Weed Instruments Co., Inc. Apparatus and method for providing a strain-resistant resistance temperature detector. 4,878,039, Cl. 338-26.000.
Kramer, Stuart C.: *See*—
Disselkoen, Allen D., Jr.; Gargiulo, Robert F.; Haywood, James E.; Heise, Keith H.; Holcomb, Darrell H.; Kramer, Stuart C.; Miller, Gregory R.; Nicholson, Jeffrey S.; Olinger, Jeffrey J.; and Spenny, Curtis H., 4,877,202, Cl. 244-122.00A.
Krause, Elke: *See*—
Ballschuh, Detlef; Seibt, Horst; Ohme, Roland; Rusche, Jochen; Gruendemann, Egon; and Krause, Elke, 4,877,885, Cl. 548-570.000.
Krause, Joachim: *See*—
Weber, Georg; Scheuble, Bernhard; and Krause, Joachim, 4,877,547, Cl. 252-299.610.
Kreeb, Reiner: *See*—
Schuster, Hans-Dieter; Noller, Christoph; Wollenraupt, Gottfried; Kreeb, Reiner; and Huss, Roland, 4,877,339, Cl. 384-218.000.
Kropkowski, James. Mixing and dispensing apparatus for game. 4,877,246, Cl. 273-144.00R.
Krueger, Loren L. Combination bar code and mark-sense reader. 4,877,948, Cl. 235-449.000.
Krueger, Ronald G., to J B Group, Inc. Method for the production of bias fabrics. 4,877,470, Cl. 156-177.000.
Kryazhevskikh, Nikolai F.: *See*—
Shishkin, Viktor V.; Kryazhevskikh, Nikolai F.; and Shapovalov, Jury P., 4,876,946, Cl. 92-93.000.
Kubinec, James J., to Advanced Micro Devices, Inc. Time variant drive circuit for high speed bus driver to limit oscillations or ringing on a bus. 4,877,980, Cl. 307-542.000.
Kubis, Leon S., to Northern Telecom Limited. Soldering pins into printed circuit boards. 4,877,176, Cl. 228-173.500.

Kubo, Motonobu: *See*—
Tamaru, Sinji; Kubo, Motonobu; and Kashiwagi, Masato, 4,877,859, Cl. 528-129.000.
Kuder, James E., to Hoechst Celanese Corporation. Optical recording medium comprising a microporous polymer recording layer. 4,878,212, Cl. 369-100.000.
Kuder, James E.; McGinnis, James L.; Goldberg, Harris A.; Hart, Timothy R.; and Che, Tessie M., to Hoechst Celanese Corporation. Dye lasers. 4,878,224, Cl. 372-53.000.
Kudo, Keisuke: *See*—
Wazaki, Yoshio; and Kudo, Keisuke, 4,877,273, Cl. 290-40.00C.
Kufrin, Fred W., to Western Industries Inc. Oscillating sprinkler. 4,877,185, Cl. 239-242.000.
Kuhn, Hans H.; and Kimbrell, William C., Jr., to Milliken Research Corporation. Method for making electrically conductive textile materials. 4,877,646, Cl. 427-121.000.
Kuhn, Lawrence H.; and Durant, Michael B., to Navistar International Transportation Corp. Electro-pneumatic tractor-trailer brake system. 4,877,294, Cl. 303-9.000.
Kula, Maria-Regina; Hummel, Werner; Schutte, Horst; and Leuchtenberger, Wolfgang, to Degussa Aktiengesellschaft and Gesellschaft fur biotechnologische Forschung-mit beschrankter Haftung GBF. Microbiologically produced α-acetylamino cinnamic acid acylase, method of its production and its use. 4,877,734, Cl. 435-228.000.
Kulicke & Soffa Industries, Inc.: *See*—
Michaud, Gerard H.; Graham, James H.; and Stout, Roger P., 4,876,791, Cl. 29-840.000.
Kumagai, Chikanori: *See*—
Tatebayashi, June; Takada, Tomoaki; Hayashi, Kimitaka; and Kumagai, Chikanori, 4,877,397, Cl. 432-106.000.
Kung, Yunn-Chiang: *See*—
Shyu, Jia-Ming; Chen, Inn-Ming; Lee, Tian-Quey; and Kung, Yunn-Chiang, 4,878,248, Cl. 382-9.000.
Kuninobu, Shigeo: *See*—
Nishiyama, Tamotsu; and Kuninobu, Shigeo, 4,878,192, Cl. 364-768.000.
Kunka, Blair S.: *See*—
Pucci, Michael J.; and Kunka, Blair S., 4,877,634, Cl. 426-531.000.
Vandenbergh, Peter A.; and Kunka, Blair S., 4,877,615, Cl. 424-115.000.
Kuno, Toshio; Shindo, Yoshikazu; Kuno, Yukio; Ueno, Takeshi; Torimi, Akira; and Mori, Yoji, to Kabushiki Kaisha Kyoritsu. Air-conditioning apparatus. 4,876,952, Cl. 98-121.200.
Kuno, Yukio: *See*—
Kuno, Toshio; Shindo, Yoshikazu; Kuno, Yukio; Ueno, Takeshi; Torimi, Akira; and Mori, Yoji, 4,876,952, Cl. 98-121.200.
Kuo, Clinton C.: *See*—
Hsieh, Ning; and Kuo, Clinton C., 4,878,101, Cl. 357-23.500.
Kuo, Pao-Kuang: *See*—
Thomas, Robert L.; Kuo, Pao-Kuang; and Favro, Lawrence D., 4,878,116, Cl. 358-160.000.
Kuramoto, Koiti: *See*—
Kondo, Masatsune; Ogura, Kiyoshi; and Kuramoto, Koiti, 4,877,833, Cl. 525-64.000.
Kurashina, Yoshikazu; Miyata, Hiroshi; and Momose, Den-ichi, to Kissei Pharmaceutical Co., Ltd. 4H-quinolizin-4-one compounds useful for the treatment of allergic bronchial asthma, allergic rhinitis atropic dermatitis and the like. 4,877,795, Cl. 514-306.000.
Kurata, Shigeo: *See*—
Kawano, Minoru; Simizu, Katsumi; Isonaga, Eiji; and Kurata, Shigeo, 4,877,874, Cl. 540-606.000.
Kurata, Takashi: *See*—
Tsuda, Yusuke; Kurata, Takashi; Suzuki, Yoshinobu; and Yamamoto, Yuji, 4,877,835, Cl. 525-67.000.
Kurauchi, Yasuhiro: *See*—
Fukuda, Kenichi; Mori, Takashi; Kurauchi, Yasuhiro; Doi, Masaharu; and Suematsu, Tetsuya, 4,877,498, Cl. 204-86.000.
Kureha Chemical Industry Co., Ltd.: *See*—
Tanaka, Yoshio; and Saitou, Shirou, 4,877,964, Cl. 250-455.100.
Kurihara, Kenji, to Nissan Motor Co., Ltd. Remotely controlled mirror device of wire type. 4,876,911, Cl. 74-502.100.
Kurita Water Industries, Ltd.: *See*—
Kobayashi, Kenji; Kaneko, Ichiro; Kobayashi, Masahiro; and Nakano, Shinji, 4,877,535, Cl. 210-701.000.
Kuroda, Masami; Hattori, Yoshimasa; Furusho, Noboru; and Sugata, Yoshinobu, to Fuji Electric Co., Ltd. Photoconductor for electrophotography having a squarylium charge generating dye. 4,877,703, Cl. 430-76.000.
Kurz, John H.: *See*—
Batson, Edward E.; and Kurz, John H., 4,877,391, Cl. 425-289.000.
Kurz, Miklos G. Bathtub silencer and overflow protector. 4,876,754, Cl. 4-546.000.
Kusakabe, Isao: *See*—
Kiuchi, Hiroshi; Murata, Katsumi; Murakami, Kazuo; Kusakabe, Isao; and Kobayashi, Hideyuki, 4,877,622, Cl. 426-46.000.
Kusaura, Akio: *See*—
Hattori, Michinobu; Fujisawa, Hidemitsu; and Kusaura, Akio, 4,877,667, Cl. 428-64.000.
Kushi, Kenji: *See*—
Sasaki, Isao; Kushi, Kenji; and Taguchi, Nobuyoshi, 4,877,922, Cl. 528-272.000.
Kusumoto, Koshi: *See*—
Hattori, Norikazu; Urabe, Sunao; and Kusumoto, Koshi, 4,877,854, Cl. 528-15.000.
Kut Kwick Corporation: *See*—
Torras, Robert M., 4,876,846, Cl. 56-11.900.
Kwack, Eug Y.: *See*—
Shakkottai, Parthasarathy; Kwack, Eug Y.; and Venkate-Shan, Shakkottai P., 4,876,889, Cl. 73-336.500.
Kwok, John C.: *See*—
Cassola, Adrian; Kwok, John C.; Robinson, Keith J.; Smith, Brian H. A.; and Longuet, Michel, 4,877,832, Cl. 525-64.000.
Kwon, In K.: *See*—
Cho, Hae S.; and Kwon, In K., 4,876,763, Cl. 15-329.000.
Kyocera Corporation: *See*—
Hirabayashi, Masaya; and Noda, Iwao, 4,877,402, Cl. 433-218.000.
Kyodo Printing Co., Ltd.: *See*—
Fujita, Minoru; and Fukushima, Yoichi, 4,877,713, Cl. 430-270.000.
Kyowa Hakko Kogyo Co., Ltd.: *See*—
Murakata, Chikara; Sato, Akira; Kasai, Masaji; Kobayashi, Eiji; Morimoto, Makoto; and Akinaga, Shiro, 4,877,776, Cl. 514-43.000.
Kyowa Medex Co., Ltd.: *See*—
Miike, Akira; Katsumata, Yukio; and Tatano, Toshio, 4,877,727, Cl. 435-24.000.
Labofina, S.A.: *See*—
Lanza, Emmanuel; and Naveau, Jean M. M. G., 4,877,863, Cl. 528-486.000.
Laboratoire L. Lafon: *See*—
Lafon, Louis, 4,877,812, Cl. 514-630.000.
Lace, Melvin A., to Oneac Corporation. Surge/transient protector for a plurality of data lines. 4,878,145, Cl. 361-118.000.
Lach, Lawrence E.; and Ohoka, Mikiharu, to Gould Inc.; and Nippon Mining Co., Ltd. Cascade FET logic circuits. 4,877,976, Cl. 307-450.000.
Lackner, John R., to Scott Fetzer Company, The. Disposable dust bag for vacuum cleaners and the like. 4,877,432, Cl. 55-375.000.
Ladd, Kevin: *See*—
Cowell, Mark J.; Ladd, Kevin; and Carter, Philip S., Jr., 4,877,944, Cl. 219-548.000.
Lafon, Louis, to Laboratoire L. Lafon. 1-(acetylaminophenyl)-2-amino-propanone derivatives and antidepressant compositions thereof. 4,877,812, Cl. 514-630.000.
LaHaye, Peter G.; and Selling, John A., to LaHaye, Peter G. Medical dispenser and preparation for inflamed tissue. 4,877,781, Cl. 514-179.000.
Lai, Kuo-Yann, to Colgate-Palmolive Company. Foam enhancing agent for light duty detergent. 4,877,546, Cl. 252-174.170.
Lamb, Reginald T.: *See*—
Rolloff, Paul D.; and Lamb, Reginald T., 4,876,758, Cl. 12-142.00N.
Lambert, Joel, to Solyfob Fonctions. Conference easel. 4,877,213, Cl. 248-451.000.
Lamboy, Peter; Steigerwald, Franz; Zulauf, Karlheinz; and Ginnow-Markert, Harmut, to Wella Aktiengesellschaft. Decanting device for liquids, e.g. permanent wave agents. 4,877,065, Cl. 141-18.000.
Lamparter, Ronald C.; and Brown, Robert J., to Transpec Inc. Vehicle safety system. 4,877,266, Cl. 280-762.000.
Lane, David W.: *See*—
Whatmore, Roger W.; Munns, Andrew G.; and Lane, David W., 4,876,776, Cl. 29-25.350.
Lane, Robert J.: *See*—
Callaghan, Jean D.; and Lane, Robert J., 4,877,269, Cl. 283-40.000.
Lang, Gerard: *See*—
Shroot, Braham; Hensby, Christopher; Maignan, Jean; Lang, Gerard; Restle, Serge; and Colin, Michel, 4,877,789, Cl. 514-255.000.
Lange, Rainer: *See*—
Popescu, Ian C.; and Lange, Rainer, 4,877,059, Cl. 137-637.100.
Langer, Hans-Joachim: *See*—
Abthoff, Joerg; Schuster, Hans-Dieter; Langer, Hans-Joachim; Strohmer, Erwin; Gabler, Rolf; and Schulte, Roland, 4,876,852, Cl. 60-275.000.
Langford, Francis L., Jr.: *See*—
Impink, Albert J., Jr.; Langford, Francis L., Jr.; Grobmyer, Louis R.; and Luinetti, William K., 4,877,575, Cl. 376-216.000.
Lanier, Carroll W.: *See*—
Broemmelsiek, H. Eugene; Lee, Raymond; and Lanier, Carroll W., 4,877,563, Cl. 264-26.000.
Lanigan Jr., John J.; Glickman, Myron; and Ermel, Bernard A., to Mi-Jack Products Inc. Side shift grappler. 4,877,365, Cl. 414-459.000.
Lanza, Emmanuel; and Naveau, Jean M. M. G., to Labofina, S.A. Process for decolorizing of polymers of the vinylaromatic-conjugated diene type. 4,877,863, Cl. 528-486.000.
Larsen, Kerstin E. I.: *See*—
Andersson, Lars-Olof; Forsman, Nanna; Larsen, Kerstin E. I.; Lundin, Annelie B.; Pavlu, Bohdan; Sandberg, Inga H.; and Sewerin, Karin M., 4,877,614, Cl. 424-101.000.
Larsen, Robert P.; Hoelke, Steven T.; and Luisi, James A., to Rockwell International Corporation. Interactive diagnostic methodology and apparatus for microelectronic devices. 4,878,179, Cl. 364-490.000.
Larson, Gordon; and Pates, John. Dispensing straw for liquid container. 4,877,148, Cl. 220-90.200.
Lautrou, Jean: *See*—
Bonnemain, Bruno; Lautrou, Jean; and Meyer, Dominique, 4,877,600, Cl. 424-4.000.
Lavielle, Gilbert; and Poignant, Jean Claude, to Adir Et Cie. New piperazinylalkylpiperazinedione compounds. 4,877,788, Cl. 514-252.000.
Law, David J. C.; and Panesar, Lukhbir S., to Lucas Industries Public Limited Company. Fuel injection pumping apparatus. 4,877,005, Cl. 123-458.000.
Lawrence, David J., to Eastman Kodak Company. Diode laser with improved means for electrically modulating the emitted light beam

intensity including turn-on and turn-off and electrically controlling the position of the emitted laser beam spot. 4,878,222, Cl. 372-48.000.

Lawrence, Paul B.: *See—*
Fagerburg, David R.; Watkins, Joseph J.; and Lawrence, Paul B., 4,877,851, Cl. 525-537.000.

LeaRonal, Inc.: *See—*
Brasch, William R., 4,877,450, Cl. 106-1.260.

Leatherman, Dennis D.; Rechlicz, Thomas; and Schwarz, Richard A., to PPG Industries, Inc. Multilayer article of microporous and porous materials. 4,877,679, Cl. 428-224.000.

Lechevalier, Mary P.: *See—*
Berger, Frank M.; Bona, Constantin; and Lechevalier, Mary P., 4,877,612, Cl. 424-92.000.

Lee, James C., to Honeywell Inc. Methods for fabricating electro-optically active niobium dioxide (NbO_2) thin films. 4,877,504, Cl. 204-192.110.

Lee, Kil J. Rotating clothes tree. 4,877,140, Cl. 211-163.000.

Lee, Paul R.; and Hingsbergen, Joseph P., to Chi-Vit Corporation. Lead-free frit. 4,877,758, Cl. 501-24.000.

Lee, Raymond: *See—*
Broemmelsiek, H. Eugene; Lee, Raymond; and Lanier, Carroll W., 4,877,563, Cl. 264-26.000.

Lee, Sherman: *See—*
Johnson, William M.; Olson, Timothy A.; Dutton, Drew J.; Lee, Sherman; and Stoenner, David W., 4,878,166, Cl. 364-200.000.

Lee, Susan. Lounge chair cover. 4,877,288, Cl. 297-229.000.

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Lees, Robert S., to New England Deaconess Hospital Corporation. Detection of vascular disease with labelled antibodies. 4,877,599, Cl. 424-1.100.

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Scheitza, Andrea, 4,876,878, Cl. 72-450.000.

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Leland Stanford Junior University, The Board of Trustees of the: *See—*
Buneman, Oscar, 4,878,187, Cl. 364-721.000.

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Stein, Judith; and Leonard, Tracey M., 4,877,828, Cl. 524-728.000.

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Leuchtenberger, Wolfgang: *See—*
Kula, Maria-Regina; Hummel, Werner; Schutte, Horst; and Leuchtenberger, Wolfgang, 4,877,734, Cl. 435-228.000.

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Gabriel, Robert; Aronson, Michael P.; and Steyn, Peter L., 4,877,544, Cl. 252-99.000.

Levitt, George: *See—*
Christensen, Joel R.; Cuomo, John; and Levitt, George, 4,877,440, Cl. 71-90.000.

Lewis, Richard A.: *See—*
Katerberg, James A.; Wint, Robert L.; and Lewis, Richard A., 4,878,064, Cl. 346-75.000.

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Sauzade, Jean-Denis; and L'Hote, Manuel, 4,878,152, Cl. 361-386.000.

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MacKenna, Craig A.; and Li, Jan-Kwei J., 4,878,181, Cl. 364-518.000.

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Lutz, Manfred; and Reimer, Bernd, 4,877,700, Cl. 430-58.000.

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Atkins, Judy M.; Comfort, Benjamin J.; and Liebelt, Ralph A., 4,877,034, Cl. 128-664.000.

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Heinze, Roland; and Liess, Hans-Dieter, 4,877,032, Cl. 128-419.0PG.

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Limon, Bernard, to Hasler Freres International S.A. Method and automatic device for measuring the content of a soluble component in a powdery product. 4,876,904, Cl. 73-866.000.

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Lin, Steve M.; and Rizzo, Joseph F., to Bell Communications Research, Inc. Multi-service telephone switching system. 4,878,240, Cl. 379-67.000.

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Shepard, Mary E.; Galloway, Deane E.; and Lind, Keith D., 4,877,684, Cl. 428-475.800.

Lindauer, Thomas W.; and Jamrozy, Richard E., to Thrall Car Manufacturing Company. Container carrying railroad car with improved support system. 4,876,968, Cl. 105-415.000.

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Aranda, Michael A.; Ebbers, Timothy J.; Iida, Yoshio; Lindgren, Terence W.; and Robertson, Taggart H., 4,878,182, Cl. 364-518.000.

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Lineback, Cecil, to Waste Management Systems, Inc. Sandblasted garbage disposal system and method of using. 4,877,190, Cl. 241-5.000.

LineTech, Inc.: *See—*
Van Meter, Larry W., 4,876,751, Cl. 4-431.000.

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Uematsu, Michio; and Suganuma, Nobuo, 4,877,602, Cl. 424-49.000.

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Teng, Chih-Sieh; Liou, Tian-I; and Chun-Min, Hiekyung, 4,877,751, Cl. 437-47.000.

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Listigovers, Nancy A.: *See—*
Mahabadi, Hadi K.; Ng, Tie H.; Listigovers, Nancy A.; and Martin, Trevor I., 4,877,706, Cl. 430-106.600.

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Nilsson, Boo, 4,877,573, Cl. 156-610.000.

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Vedros, Neylan A.; and Liu, Te-ning E., 4,877,613, Cl. 424-92.000.

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Bernstein, Gary; Ferry, David K.; and Liu, Wenping, 4,877,716, Cl. 430-309.000.

Ljung, Stefan: *See—*
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Lloyd, Ian, to Nautical Services Pty. Ltd. Electronic control and dosing system for desalinators. 4,877,489, Cl. 202-181.000.

Lo, Ying-Cheng, to Aluminum Company of America. Apparatus for producing biaxially oriented polymer sheet. 4,877,393, Cl. 425-383.000.

Lockheed Corporation: *See—*
Marrache, Albert A.; and Snipes, Frank C., Jr., 4,876,973, Cl. 112-121.160.

Loew, Dieter; Schuster, Otto; and Lukas, H., to MEDICE Chem.-Pharm. Fabrik Putter GmbH & Co. KG. Ibuprofen-containing medicament. 4,877,620, Cl. 424-451.000.

Logan, James L., to General Motors Corp. Stroking fascia for vehicle energy absorbing bumper systems. 4,877,279, Cl. 293-121.000.

Loggers, Hendrik, to Aardelite Holding B.V. Process of pretreating a pozzolanic material for increasing the pozzolanic properties of said material. 4,877,453, Cl. 106-118.000.

Lombardo, Philip C. Gun rest for supporting the buttstock. 4,876,814, Cl. 42-94.000.

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Cassola, Adrian; Kwok, John C.; Robinson, Keith J.; Smith, Brian H. A.; and Longuet, Michel, 4,877,832, Cl. 525-64.000.

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Meul, Thomas, 4,877,884, Cl. 548-544.000.

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Bierman, Laurence W.; Lopez, Michael L.; and Perkins, James E., III, 4,877,594, Cl. 423-321.00S.

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Anthony, James R.; Merrick, David; Homeier, Ronald F.; and Lortz, Allan R., 4,876,772, Cl. 24-637.000.

Lovey, Raymond G.; and Elliott, Arthur J., to Schering Corporation. 1-Aryl-1-(1H-azol-1-ylalkyl)-1,3-dihydroisobenzofurans, related derivatives and pharmaceutical compositions thereof useful as antifungals. 4,877,801, Cl. 548-336.000.

LSI Logic Corporation: *See*—
Watkins, Daniel; Wong, Jimmy; and Ennghillis, Pavlina, 4,878,174, Cl. 364-200.000.

LTV Aerospace and Defense Company: *See*—
Pekar, Gary W.; Mason, Jack W.; and Blanc, Michael, 4,876,800, Cl. 33-784.000.

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Law, David J. C.; and Panesar, Lukhbir S., 4,877,005, Cl. 123-458.000.

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Wester-Ebbinghaus, Wilfried; Luhmann, Thomas; Mangelsdorf, Juergen; and Pini, Peter, 4,878,247, Cl. 382-1.000.

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Impink, Albert J., Jr.; Langford, Francis L., Jr.; Grobmyer, Louis R.; and Luinetti, William K., 4,877,575, Cl. 376-216.000.

Luisi, James A.: *See*—
Larsen, Robert P.; Hoelke, Steven T.; and Luisi, James A., 4,878,179, Cl. 364-490.000.

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Lukacs, Alexander, III, to Hercules Incorporated. Aqueous suspension of delaminated vermiculite. 4,877,551, Cl. 252-378.00R.

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Loew, Dieter; Schuster, Otto; and Lukas, H., 4,877,620, Cl. 424-451.000.

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Shaw, Allan; and Luxton, Russell E., 4,876,858, Cl. 62-93.000.

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Lundin, Annelie B.: *See*—
Andersson, Lars-Olof; Forsman, Nanna; Larsen, Kerstin E. I.; Lundin, Annelie B.; Pavlu, Bohdan; Sandberg, Inga H.; and Sewerin, Karin M., 4,877,614, Cl. 424-101.000.

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Maninger, Loren L.; New, David A.; and Lundvall, Carl L., II, 4,877,998, Cl. 315-15.000.

Lush, Richard A.; and Tsao, Hsiang-Wei, to Sun Refining and Marketing Company. Process for removing arsine impurities in process streams. 4,877,920, Cl. 585-823.000.

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York, Rudy L.; Luttmer, Joseph D.; Smith, Patricia B.; and Davis, Cecil J., 4,877,757, Cl. 437-235.000.

Lutz, Manfred; and Reimer, Bernd, to Licentia Patent-Verwaltungs-GmbH. Layered electrophotographic recording material containing selenium, arsenic and bismuth or tellurium. 4,877,700, Cl. 430-58.000.

Luxton, Russell E.: *See*—
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Luxton, Russell Estcourt: *See*—
Shaw, Allan; and Luxton, Russell E., 4,876,858, Cl. 62-93.000.

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Gartner, Georg F.; and Lydtin, Hans-Jurgen, 4,877,642, Cl. 427-38.000.

Lynch, James E.: *See*—
Ford, David B.; Lynch, James E.; and Rateike, Leroy R., 4,877,093, Cl. 175-113.000.

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Del Fabro, Giorgio; and Del Fabro, Marcello, 4,876,873, Cl. 72-162.000.

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Shih, Meng-Fu; Cochran, Mark D.; and Macdonald, Richard D., 4,877,737, Cl. 435-235.000.

MacKenna, Craig A.; and Li, Jan-Kwei J., to Signetics Corporation. Video display controller for expanding monochrome data to programmable foreground and background color image data. 4,878,181, Cl. 364-518.000.

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Bilger, Gerhard; Mader, Helmut; and Matzagg, Erich, 4,876,939, Cl. 89-33.040.
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Maeda, Kimio: *See*—
Kiya, Nobuyuki; and Maeda, Kimio, 4,878,171, Cl. 364-474.290.

Maeda, Kiyoto: *See*—
Mori, Tatsuya; Ohsumi, Tadashi; Nakamura, Shigeo; Maeda, Kiyoto; Nishida, Sumio; and Takano, Hirotaka, 4,877,441, Cl. 71-90.000.

Maeda, Shigeyoshi; Asai, Tsunetoshi; Asano, Hidejiro; and Taguchi, Haruyoshi, to Nippon Steel Corporation; Suntory Limited; and Kansai Paint Company, Ltd. Materials having a deoxidation function and a method of removing oxygen in sealed containers. 4,877,664, Cl. 428-35.900.

Maekawa, Yukio: *See*—
Hamada, Masataka; Karasaki, Toshihiko; Matsui, Toru; and Maekawa, Yukio, 4,878,079, Cl. 354-402.000.

Maemoto, Kazuo: *See*—
Aoai, Toshiaki; Maemoto, Kazuo; Kamiya, Akihiko; and Misu, Hiroshi, 4,877,711, Cl. 430-176.000.

Maeno, Hitoshi; Miyazawa, Azuma; and Maruyama, Astushi, to Olympus Optical Company Ltd. Motor drive and control apparatus for a camera. 4,878,077, Cl. 354-400.000.

MagneTek Universal Electric: *See*—
Colwell, Robert A.; and Stone, Thomas W., 4,877,984, Cl. 310-66.000.

Mahabadi, Hadi K.; Ng, Tie H.; Listigovers, Nancy A.; and Martin, Trevor I., to Xerox Corporation. Single component cold pressure fixable encapsulated toner compositions. 4,877,706, Cl. 430-106.600.

Mahlab, David: *See*—
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Maier, Iris: *See*—
Andrei-Alexandru, Marcel; Bayha, Heiner; Bruhn, Rainer; and Maier, Iris, 4,876,909, Cl. 74-411.500.

Maier, Konrad, to Von Roll, AG. Cast shafts, particularly camshafts. 4,876,916, Cl. 74-567.000.

Maignan, Jean: *See*—
Shroot, Braham; Hensby, Christopher; Maignan, Jean; Lang, Gerard; Restle, Serge; and Colin, Michel, 4,877,789, Cl. 514-255.000.

Main, W. Eric, to Motorola, Inc. Class B variable gain control circuit. 4,878,031, Cl. 330-254.000.

Makino, Toshihiko; and Nagasawa, Makoto, to NEC Corporation. Method and system for a magnetic disk drive employing a quadratic compensation function for determining an offset correction value. 4,878,135, Cl. 360-78.040.

Makris, Luke; and Dimopoulos, George. Syringe protection device. 4,877,132, Cl. 206-364.000.

Malaker, Stephen F., to Cryodynamics, Inc. Cryogenic refrigerator. 4,877,434, Cl. 62-6.000.

Malcom Smith Products: *See*—
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Maldonado, Rene; Trinh, Toan; and Gosselink, Eugene P., to Procter & Gamble Company, The. Sulfoaroyl end-capped ester of oligomers suitable as soil-release agents in detergent compositions and fabric-conditioner articles. 4,877,896, Cl. 560-14.000.

Malin, Richard A.: *See*—
Riley, Gilbert N.; Holodnak, Richard S.; and Malin, Richard A., 4,876,956, Cl. 101-91.000.

Malinowski, Roger A., to Malcom Smith Products. Bicycle brake cable assembly. 4,877,112, Cl. 188-24.220.

Malloy, James T. Electrical testing device. 4,878,018, Cl. 324-158.00F.

Maly, Friedrich E.; de Week, Alain L.; and Henderson, David, to Schering Aktiengesellschaft. Pregnancy test with EPF. 4,877,742, Cl. 436-65.000.

Mandel, Barry P., to Xerox Corporation. Sheet turning and registration system. 4,877,234, Cl. 271-225.000.

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Wester-Ebbinghaus, Wilfried; Luhmann, Thomas; Mangelsdorf, Juergen; and Pini, Peter, 4,878,247, Cl. 382-1.000.

Maninger, Loren L.; New, David A.; and Lundvall, Carl L., II, to RCA Licensing Corp. Color display system having an electron gun with dual electrode modulation. 4,877,998, Cl. 315-15.000.

Mannato, Pietro, to Finduck S.r.l. Lock particularly adapted for bags, brief-bags, or the like. 4,876,863, Cl. 70-64.000.

Manner, Reinhard: *See*—
Klingle, Reinhard; and Manner, Reinhard, 4,877,595, Cl. 423-335.000.

Manner, Warren R., to Manner, Warren R. Ribbon wrapped intrinsic opening plastic package. 4,877,145, Cl. 220-83.000.

Mannesmann AG: *See*—
Flaig, Heinz; Neumann, Udo; Hasselmann, Heinz; Zacharias, Karl; Horbach, Rainer; and Bitsch, Harald, 4,877,987, Cl. 310-209.000.

Marcum, Bruce; and Reynolds, Robert C., to Pacific Clam Pty. Ltd. Method of and apparatus for breeding and/or raising shell fish such as giant clams. 4,876,985, Cl. 119-4.000.

Maresca, Louis M., to General Electric Company. Thermoplastic blends containing polyamide and epoxy functional compound. 4,877,848, Cl. 525-423.000.

Marion Laboratories, Inc.: *See*—
Rzeszotarski, Waclaw J.; Guzewska, Maria E.; Carter, John P.; Adams, Theodore C.; Dupont, Andrea C.; and Kaiser, Carl, 4,877,779, Cl. 514-63.000.

Maris, Nicholas P.: *See*—
Tsaprazis, Edward; Maris, Nicholas P.; and Montague, Charles, 4,878,019, Cl. 324-204.000.
Markowitz, Steven. Window shade assembly. 4,877,075, Cl. 160-84.100.
Marrache, Albert A.; and Snipes, Frank C., Jr., to Lockheed Corporation. Method of and apparatus for blind tufting composite laminated joints. 4,876,973, Cl. 112-121.160.
Marsden, Eric P.; and Checkland, John A., to Northern Telecom Limited. Electrically insulated wire. 4,877,467, Cl. 156-51.000.
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Martin, Michael C.; McCracken, Beth E.; and Gulko, George M., to Texaco, Inc. Synthetic gas cooler with thermal protection. 4,876,987, Cl. 122-504.200.
Martin, Serge: *See*—
Duffour, Henri; Martin, Serge; and Studer, Ernst, 4,877,928, Cl. 200-144.00R.
Martin, Timothy J.: *See*—
Vu, Cung; Martin, Timothy J.; Gillanders, Andrew M.; and Sbaiti, Bassam, 4,877,829, Cl. 524-729.000.
Martin, Trevor I.: *See*—
Mahabadi, Hadi K.; Ng, Tie H.; Listigovers, Nancy A.; and Martin, Trevor I., 4,877,706, Cl. 430-106.600.
Marume, Yoshihiro; and Iwamoto, Tadao, to Nishikawa Rubber Co., Ltd. Manufacturing framework for use in manufacturing a cosmetic-puff. 4,877,215, Cl. 249-109.000.
Maruyama, Astushi: *See*—
Maeno, Hitoshi; Miyazawa, Azuma; and Maruyama, Astushi, 4,878,077, Cl. 354-400.000.
Maruyama, Hiroyuki; Kishimoto, Tadao; Isobe, Toshifumi; and Yokobori, Jun, to Konishiroku Photo Industry Co., Ltd. Color image processing apparatus which accurately registers multiple color images by counting pulses from a timer reset by a drum index signal. 4,878,110, Cl. 358-75.000.
Maruyama Tokuji: *See*—
Honma, Masahiro; Maruyama Tokuji; Okada, Masashi; and Hida, Yukio, 4,877,941, Cl. 219-130.210.
Mason, Jack W.: *See*—
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Masu, Masanobu; Yoshioka, Hiroshi; Kouno, Kenzi; Nomura, Isao; and Yamamiya, Kazuo, to Mitsubishi Gas Chemical Company, Inc. Polyphenylene ether resin composition. 4,877,847, Cl. 525-397.000.
Masuda, Hisao: *See*—
Fujimoto, Hitoshi; and Masuda, Hisao, 4,877,173, Cl. 228-1.100.
Masuda, Shunichi: *See*—
Shimizu, Katsuichi; Masuda, Shunichi; Yagasaki, Toshiaki; and Sakamaki, Hisashi, 4,878,130, Cl. 358-400.000.
Masugi, Takashi: *See*—
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Masuhiko Takigawa: *See*—
Ikebe, Takashi; and Takigawa: Masuhiko, 4,877,018, Cl. 128-81.00R.
Masui, Toshiyuki; Kashida, Motokazu; Takahashi, Koji; and Nagasawa, Kenichi, to Canon Kabushiki Kaisha. Information signal recording apparatus for aligning helical slant tracks. 4,878,134, Cl. 360-77.150.
Matherly, James F.: *See*—
Pugh, J. Robert; and Matherly, James F., 4,877,182, Cl. 236-44.00C.
Mathews, Hans-Gunter; and Schafheitle, Oskar, to BBC Brown Boveri AG. Flange connection using a radially elastic centering ring. 4,878,037, Cl. 333-254.000.
Matros, Jury S.; Chumachenko, Viktor A.; Zudilina, Ljudmila J.; Noskov, Alexandr S.; and Bugdan, Evgeny S., to Institut Kataliza Sibirskogo Otdelenia Akademii Nauk SSSR; and Spetsialnoe Konstruktorsko-Technologicheskoe Bjuro Katalizatorov S Optnym Zavodom (Skib Katalizatorov). Method of catalytic cleaning of exhaust gases. 4,877,592, Cl. 423-245.100.
Matsubayashi, Shigeaki: *See*—
Gotou, Makoto; and Matsubayashi, Shigeaki, 4,878,165, Cl. 364-158.000.
Matsuda, Kenji; Togashi, Kenji; Umemura, Hiroyuki; Okada, Tetsuji; Ishioka, Hidenori; and Aoki, Katsuyuki, to Mitsubishi Denki Kabushiki Kaisha. Air flow control device for an air conditioner. 4,877,183, Cl. 236-49.300.
Matsuda, Yasuo: *See*—
Yamato, Ikuo; Tokunaga, Norikazu; Matsuda, Yasuo; and Amano, Hisao, 4,878,163, Cl. 363-8.000.
Matsui, Isamu; Ohashi, Kenji; and Deno, Koji, to Murata Kikai Kabushiki Kaisha. Method for preventing defective splicing for automatic winders. 4,877,194, Cl. 242-35.60R.
Matsui, Sadayoshi: *See*—
Morimoto, Taiji; Hosoba, Hiroyuki; Matsumoto, Mitsuhiro; Taneya, Mototaka; and Matsui, Sadayoshi, 4,878,223, Cl. 372-50.000.
Matsui, Sumio. Dispensing container for paper tissues and the like. 4,877,154, Cl. 221-48.000.
Matsui, Toru: *See*—
Hamada, Masataka; Karasaki, Toshihiko; Matsui, Toru; and Maekawa, Yukio, 4,878,079, Cl. 354-402.000.
Matsumoto, Hiromi: *See*—
Kakehi, Nobuo; Takahashi, Yuzuru; Higuchi, Norio; Izumihara, Yoshikazu; Matsumoto, Hiromi; and Uehori, Yuji, 4,876,874, Cl. 72-199.000.
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Futatsuka, Rensei; Chiba, Synu-ichi; and Sakakibara, Tadao, 4,877,577, Cl. 420-473.000.
Mitsui Petrochemical Industries, Ltd.: *See*—
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Tojo, Tetsuo; Nakahara, Takashi; Otawa, Yasuhiko; and Okamoto, Katsuo, 4,877,817, Cl. 521-142.000.
Mitsui Toatsu Chemicals, Incorporated: *See*—
Miura, Tohru; Nagata, Teruyuki; Okazaki, Koju; Furuya, Masayuki; and Nishida, Emiko, 4,877,907, Cl. 568-721.000.
Mittelhauser, Bernhard. External mirror for a vehicle. 4,877,319, Cl. 350-604.000.
Mitutoyo Corporation: *See*—
Andermo, Nils I., 4,878,013, Cl. 324-61.00R.
Mitzmacher, Harry. Electric wire connector with built-in stripper and strip gauge. 4,877,924, Cl. 174-87.000.
Miura, Satoshi: *See*—
Suzuki, Hiroaki; Kataoka, Yoshiyuki; Murase, Michio; Inoue, Kotaro; Sumida, Isao; Yamanari, Shozo; Matsumoto, Masaki; Miura, Satoshi; and Hashimoto, Koji, 4,877,574, Cl. 376-216.000.
Miura, Shigeo; Takahashi, Masatomo; Yoshino, Motoaki; Watanabe, Tsunehiro; Toyama, Takeshi; and Takahashi, Taketo, to Canon Kabushiki Kaisha. Image processing apparatus having image memory. 4,878,123, Cl. 358-401.000.
Miura, Tohru; Nagata, Teruyuki; Okazaki, Koju; Furuya, Masayuki; and Nishida, Emiko, to Mitsui Toatsu Chemicals, Incorporated. Preparation process of 4,4'-biphenol, precursor of same and preparation process of precursor. 4,877,907, Cl. 568-721.000.
Miwa, Harufumi; Kashiwada, Minoru; and Goto, Ikuo, to Ajinomoto Company, Inc. Fluorescent analyzer. 4,877,583, Cl. 422-73.000.
Miwa, Kazunori, to Nissan Motor Co., Ltd. Thin layer EL panel. 4,877,968, Cl. 250-484.100.
Miwa, Teiji: *See*—
Yamamoto, Yasuhiro; Miwa, Teiji; and Ajima, Tadashi, 4,876,786, Cl. 29-429.000.
Miya, Shigenori: *See*—
Hagihara, Hisao; Banno, Takayuki; Miya, Shigenori; and Tanaka, Norio, 4,876,778, Cl. 29-157.30A.
Miyabori, Toru: *See*—
Kinoshita, Mikio; Ohta, Wasaburo; and Miyabori, Toru, 4,876,984, Cl. 118-723.000.
Miyafuzi, Hideaki: *See*—
Kambe, Shigemitsu; and Miyafuzi, Hideaki, 4,877,663, Cl. 428-35.500.

Miyakawa, Shinji: *See*—
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Miyamoto, Eiichi; Mutou, Nariaki; and Nakazawa, Tooru, to Mita Industrial Co., Ltd. Electrophotographic sensitive material. 4,877,702, Cl. 430-72.000.
Miyasaka, Masao: *See*—
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Miyata, Hiroshi: *See*—
Kurashina, Yoshikazu; Miyata, Hiroshi; and Momose, Den-ichi, 4,877,795, Cl. 514-306.000.
Miyazaki, Akira: *See*—
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Miyazawa, Azuma: *See*—
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Mizoguchi, Takenobu: *See*—
Tsuji, Masayoshi; Nakagawa, Akira; Inoue, Hisataka; Hachiya, Terumi; Tanoue, Yoshihiro; Ikesue, Kouichi; Saita, Masaru; Mizoguchi, Takenobu; Aoki, Testsuo; Sato, Hironobu; and Nodo, Kanji, 4,877,876, Cl. 544-133.000.
Mizota Industrial Co., Ltd.: *See*—
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Mizuhara, Howard; and Huebel, Eugene, to GTE Products Corporation. Clad system for brazing to alumina. 4,877,692, Cl. 428-673.000.
Mizui, Kinya: *See*—
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Mizuno, Hitoshi: *See*—
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Mizuno, Keiichiro; and Iida, Kazuyoshi, to Bridgestone Corporation. Vibration free container for transportation. 4,877,136, Cl. 206-521.000.
Mizuno, Yukio: *See*—
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Mizusaki, Sigenobu; Matsushita, Hajime; Ishiguro, Shigeo; Ichinose, Hiroshi; and Izumi, Akira, to Japan Tobacco, Inc. Process for reducing aldehydes or ketones. 4,877,909, Cl. 568-880.000.
Mizutani, Yoshihisa, to Kabushiki Kaisha Toshiba. Semiconductor memory device. 4,878,199, Cl. 365-185.000.
MKS Instruments, Inc.: *See*—
Day, Christopher C., 4,877,051, Cl. 137-486.000.
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Valyocsik, Ernest W., 4,877,593, Cl. 423-306.000.
Mobil Oil Corporation: *See*—
Audeh, Costandi A., 4,877,515, Cl. 208-251.00R.
Chen, Nai Y.; and Walsh, Dennis E., 4,877,581, Cl. 585-751.000.
Gross, Jonathan, 4,877,564, Cl. 264-40.600.
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Zampino, Michael J.; Wilson, Richard A.; Mookherjee, Braja D.; and Niel, Jean C., 4,877,769, Cl. 512-11.000.
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Moore, James A.; Dasheff, Andrew N.; and Kaufman, Frank B., to Rennsselaer Polytechnic Institute; and International Business Machines Corporation. Positive-working photosensitive polyimide operated by photo induced molecular weight changes. 4,877,718, Cl. 430-326.000.
Moore, T. Charles: *See*—
Rorden, Louis H.; and Moore, T. Charles, 4,878,053, Cl. 340-853.000.
Moreau, Philippe; and Fiorina, Jean-Noel, to Merlin Gerin. Measuring circuit of the DC component of the current flowing through the primary winding of the output transformer of an inverter. 4,878,026, Cl. 324-547.000.
Morgan, Alan R.; Selman, Steven H.; Garbo, Greta M.; and Keck, Rick W., to University of Toledo, The. Production and use of dimers of hematoporophyrin, purpurins, chlorines and purpurin- and chlorin-complexes. 4,877,872, Cl. 540-145.000.
Mori, Hiroyuki: *See*—
Koyano, Tetsuo; Sagi, Nobuo; Izumi, Tsugio; Fujita, Setsuya; Murata, Tadahiko; Hachiya, Iwao; and Mori, Hiroyuki, 4,877,636, Cl. 426-607.000.
Mori, Junko: *See*—
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Mori, Tatsuya; Ohsumi, Tadashi; Nakamura, Shigeo; Maeda, Kiyoto; Nishida, Sumio; and Takano, Hirotaka, to Sumitomo Chemical Company Ltd. Fungicidal substituted carboxylic acid derivatives. 4,877,441, Cl. 71-90.000.
Mori, Toru, to Oki Electric Industry Co., Ltd. Transaction processing system. 4,877,947, Cl. 235-381.000.
Mori, Yoji: *See*—
Kuno, Toshio; Shindo, Yoshikazu; Kuno, Yukio; Ueno, Takeshi; Torimi, Akira; and Mori, Yoji, 4,876,952, Cl. 98-121.200.
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Morimoto, Makoto: *See*—
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Morimoto, Taiji; Hosoba, Hiroyuki; Matsumoto, Mitsuhiro; Taneya, Mototaka; and Matsui, Sadayoshi, to Sharp Kabushiki Kaisha. Semiconductor laser array device. 4,878,223, Cl. 372-50.000.
Morimoto, Takeshi; and Endoh, Eiji, to Asahi Glass Company, Ltd. Highly durable cathode of low hydrogen overvoltage and method for manufacturing the same. 4,877,508, Cl. 204-290.00R.
Morin, Normand. Conveyor belt scrapers. 4,877,122, Cl. 198-499.000.
Morinaga, Akio: *See*—
Higuchi, Kumao; Morinaga, Akio; Seshimo, Masahiro; and Saito, Hitoshi, 4,877,665, Cl. 428-36.100.
Morioka, Takayuki; Motoyama, Nobuyuki; Hoshikawa, Hiroshi; Takahashi, Takeo; Suzuki, Sizuo; Ishikawa, Tuyoshi; Toyoshi, Takanori; and Uede, Toshio, to Fuji Electric Co., Ltd. Method of treating radioactive ion-exchange resins by oxidative decomposition. 4,877,558, Cl. 252-626.000.
Morita, Hiroshi: *See*—
Ogawa, Toshiaki; Fujiwara, Nobuo; Kawai, Kenji; Shibano, Teruo; Morita, Hiroshi; and Nishioka, Kyusaku, 4,877,509, Cl. 204-298.000.
Morita, Kouichi: *See*—
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Morita, Seizo: *See*—
Okada, Takao; Kouchi, Toshihito; Mishima, Shuzo; Ogawa, Haruo; Morita, Seizo; and Mikoshiba, Nobuo, 4,877,957, Cl. 250-306.000.
Morita, Shizuo; Hayakawa, Kazushi; Ito, Kunio; Matsuo, Shunji; Fukuchi, Masakazu; and Hatakeyama, Noboru, to Konica Corporation. Multicolor image forming apparatus. 4,878,091, Cl. 355-260.000.
Moriya, Kazumasa: *See*—
Okawa, Kazuyoshi; Moriya, Kazumasa; Kashiwazaki, Tomoyuki; Kawashima, Hiroshi; and Murakawa, Yoshitaka, 4,876,966, Cl. 104-290.000.
Moriya, Yasuo; Suzuki, Nobuyoshi; and Goto, Hiroshi, to Nippon Oil and Fats Co., Ltd. Graft polymerization preformer and method of manufacturing the same. 4,877,841, Cl. 525-286.000.
Morooka, Yasuo: *See*—
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Morris, Gregory J. E.: *See*—
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Morrison, Donald R. Braking system for a motorized dumping vehicle. 4,877,104, Cl. 180-308.000.
Morrison, Ian D.: *See*—
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Mortreux, Andre: *See*—
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Moses, John M., to CF Systems Corporation. Liquid CO_2/cosolvent extraction. 4,877,530, Cl. 210-511.000.
Moskowitz, Mark L.: *See*—
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Motiwala, Mohammad I., to Boeing Company, The. Fastener head elevation measuring apparatus. 4,877,138, Cl. 209-601.000.
Motoren-und Turbinen-Union Munchen GmbH: *See*—
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Motorola Inc.: *See*—
Knapp, James H.; Carney, George F.; and Carney, Francis J., 4,877,482, Cl. 156-643.000.
Main, W. Eric, 4,878,031, Cl. 330-254.000.
Urbish, Glenn F.; Mullen, William B., III; and Mooney, Charles W., 4,877,569, Cl. 264-221.000.
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Michiaki; Ishida, Masahiko; and Kono, Shunzo, 4,877,680, Cl. 428-332.000.

Mrklas, Louis. Grate bar element for a sliding grate furnace for garbage incineration. 4,876,972, Cl. 110-298.000.

MSK-Verpackunga-Systeme Gesellschaft: *See—*
Hannen, Reiner; and Vermeulen, Norbert, 4,877,012, Cl. 126-79.00R.

Mt. Fury Company: *See—*
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MTU Motoren- und Turbinen-Union Munchen GmbH: *See—*
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Muchnik, Boris J.; and Fischer, Bernd F., to Kerdix, Inc. Magneto-optic substrates. 4,877,666, Cl. 428-64.000.

Mudzhiri, Levan A.; Alkhazashvili, Gia G.; Kalatozishvili, Elena I.; Chekurishvili, Gia O.; Brekhman, Izrail I.; Bulanov, Alexandr E.; and Polozhentseva, Mira I. Alcoholic beverage and process for producing same. 4,877,772, Cl. 514-23.000.

Muehlberger, Erich; and Sickinger, Albert, to Electro-Plasma, Inc. Method of oxide removal from metallic powder. 4,877,640, Cl. 427-34.000.

Mueller, Theodore: *See—*
Ecoffey, Olivier; Mueller, Theodore; and Sigg, Hans, 4,876,883, Cl. 73-37.500.

Mueller, Werner, to Messerschmitt-Boelkow-Blohm GmbH. Infrared radiation screening device. 4,876,851, Cl. 60-264.000.

Muether, Manfred: *See—*
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Mugikura, Norio, to Honda Giken Kogyo Kabushiki Kaisha. Rear speaker unit for a motor vehicle. 4,877,105, Cl. 181-141.000.

Mukai, Hiromu: *See—*
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Mullen, Robert S. Door opening apparatus and method of using same. 4,876,927, Cl. 81-15.900.

Mullen, William B., III: *See—*
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Mullens, Paul A.: *See—*
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Muller, Friedhelm; and Ruthenberg, Klaus, to Continental Aktiengesellschaft. Internal mixer. 4,877,328, Cl. 366-76.000.

Muller, Lothar: *See—*
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Muller, Manfred: *See—*
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Muller, Niklaus, to Castolin S.A. Plasma spray torch. 4,877,937, Cl. 219-121.590.

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Felt, George R.; Multhauf, Donna K.; and Wagle, Sudhakar S., 4,876,891, Cl. 73-426.000.

Munch, Norbert: *See—*
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Munns, Andrew G.: *See—*
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Munson, Arthur E.: *See—*
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Murabayashi, Katsuyoshi; and Mitani, Katsuyoshi, to Daicel Chemical Industries, Ltd. Deodorant and antibacterial foamed polymer and sheet. 4,877,816, Cl. 521-92.000.

Murakami Kaimeido Co., Ltd.: *See—*
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Murakami, Kazuo: *See—*
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Murakami, Tokumichi; Nishida, Masami; and Ito, Atsushi, to Mitsubishi Denki Kabushiki Kaisha. Amplitude-adaptive vector quantization system. 4,878,230, Cl. 375-27.000.

Murakata, Chikara; Sato, Akira; Kasai, Masaji; Kobayashi, Eiji; Morimoto, Makoto; and Akinaga, Shiro, to Kyowa Hakko Kogyo Co., Ltd. K-252 compounds. 4,877,776, Cl. 514-43.000.

Murakawa, Yoshitaka: *See—*
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Murase, Michio: *See—*
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Murata Kikai Kabushiki Kaisha: *See—*
Kawamura, Shuzo, 4,877,967, Cl. 250-461.100.
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Murata Manufacturing Co., Ltd.: *See—*
Honma, Kanehito; Yokoi, Tsutomu; and Tani, Hiroji, 4,877,554, Cl. 252-511.000.
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Muro, Hideo, to Nissan Motor Company, Limited. Photosensitive position sensor. 4,877,951, Cl. 250-211.00J.

Murphy, Susan A.: *See—*
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Muszak, Martin F., to Eastman Kodak Company. Stopper remover apparatus. 4,876,926, Cl. 81-3.200.

Muto, Takashi, to Daido Metal Company. Composite sliding structure. 4,877,696, Cl. 428-645.000.

Mutou, Nariaki: *See—*
Miyamoto, Eiichi; Mutou, Nariaki; and Nakazawa, Tooru, 4,877,702, Cl. 430-72.000.

Myers, David J.: *See—*
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Myers, Herman A., to Radia-Cam Inc. Variable mechanical advantage device utilizing a radial cam. 4,876,794, Cl. 30-252.000.

Nabisco Brands, Inc.: *See—*
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Nabulon, Werner, to Rieter Machine Works Ltd. Method for continuously crimping thermoplastic filaments. 4,877,570, Cl. 264-282.000.

Naegeli, Peter, to Givaudan Corporation. Bicyclic ketones as odorants and flavorants. 4,877,904, Cl. 568-374.000.

Nagano, Eiki: *See—*
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Nagano, Shuji; and Inui, Masaki, to Toyota Jidosha Kabushiki Kaisha. Power transfer device for four-wheel drive. 4,876,919, Cl. 74-650.000.

Nagaoka, Hisayuki; Zenbayashi, Michio; and Shimizu, Chiyuki, to Toshiba Silicone Co., Ltd. Siloxane-amide block copolymer and process for producing the same. 4,877,855, Cl. 528-26.000.

Nagasaka, Masumi: *See—*
Tada, Tetsuya; Nagasaka, Masumi; Teratani, Tatsuo; Miyazaki, Akira; and Takahashi, Junji, 4,877,101, Cl. 180-177.000.

Nagasawa, Kenichi: *See—*
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Nagasawa, Makoto: *See—*
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Nagy, Gabor; Neumann, Gyorgy; Kovacs, Marta; and Strompl, Andras, to BRG Mechatronikai Vallalat. Tape-conveying system for forward and backward playing magnetic tape recorder and/or playback unit. 4,877,199, Cl. 242-201.000.

Naka, Ryoichi: *See—*
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Nakagawa, Akira: *See—*
Tsuji, Masayoshi; Nakagawa, Akira; Inoue, Hisataka; Hachiya, Terumi; Tanoue, Yoshihiro; Ikesue, Kouichi; Saita, Masaru; Mizoguchi, Takenobu; Aoki, Testsuo; Sato, Hironobu; and Nodo, Kanji, 4,877,876, Cl. 544-133.000.

Nakagawa, Koji; Takagi, Takeo; Abe, Yoshiaki; and Sakai, Haruki, to Hitachi, Ltd. Diffuser for centrifugal compressor. 4,877,370, Cl. 415-148.000.

Nakagawa, Shinichi: *See—*
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Nakahara, Takashi: *See—*
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Silgailis, John; Nathasingh, Davidson; and Bruckner, Christopher A., 4,877,464, Cl. 148-108.000.
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Ford, David B.; Lynch, James E.; and Rateike, Leroy R., 4,877,093, Cl. 175-113.000.
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Costall, Brenda, 4,877,800, Cl. 514-328.000.
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Gallichio, Michael J., 4,878,151, Cl. 361-329.000.
Needles, William M., 4,878,058, Cl. 341-101.000.
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Lloyd, Ian, 4,877,489, Cl. 202-181.000.
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Kuhn, Lawrence H.; and Durant, Michael B., 4,877,294, Cl. 303-9.000.
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Hashimoto, Kiyokazu, 4,878,220, Cl. 371-40.100.
Hirakawa, Noboru; and Inoue, Yasukazu, 4,878,105, Cl. 357-59.000.
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Makino, Toshihiko; and Nagasawa, Makoto, 4,878,135, Cl. 360-78.040.
Nakaizumi, Kazuo, 4,878,201, Cl. 365-203.000.
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Reno, John M.; and Bottino, Becky J., 4,877,868, Cl. 530-390.000.
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Geibel, Jon F.; and Nesheiwat, Afif, 4,877,850, Cl. 525-471.000.
Nessel, Eliezer, to Iscar Ltd. Cutting tool holder. 4,876,932, Cl. 82-158.000.
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Bergstrom, Christer; and Palmgren, Tor H., 4,877,685, Cl. 428-500.000.
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Maninger, Loren L.; New, David A.; and Lundvall, Carl L., II, 4,877,998, Cl. 315-15.000.
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Lees, Robert S., 4,877,599, Cl. 424-1.100.
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Neurath, Alexander R.; and Strick, Nathan, 4,877,725, Cl. 435-5.000.
New York Institute of Technology: *See*—
Glenn, William E., 4,878,122, Cl. 358-233.000.
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Ling, Lorraine B.; and Ng, Thomas K., 4,877,731, Cl. 435-142.000.
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Hamanaka, Toshiyuki, 4,877,670, Cl. 428-116.000.
Minamikawa, Masayasu; Onabe, Yoshiaki; and Ono, Masanao, 4,877,970, Cl. 250-560.000.
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Okuno, Akiyasu; Watanabe, Masakazu; and Ikoma, Kazuhiko, 4,877,760, Cl. 501-98.000.
Ngo, Dinh T.: *See*—
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Nicholson, Jeffrey S.: *See—*
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Vaccaro, Nicola, 4,876,756, Cl. 5-455.000.

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Alt, Claus-Christian; Gobel, Rudolf; Koch, Heinz; Niechoj, Wolfgang; Grossmann, Theodor; and Deffner, Felix, 4,877,258, Cl. 277-212.0FB.

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Nihashi, Hiroyuki: *See—*
Hanada, Koji; Sawamura, Masashi; Yoshikawa, Takeshi; Nihashi, Hiroyuki; and Tanaka, Tsuneo, 4,877,681, Cl. 428-336.000.

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Yatsuda, Hiromi; Takeuchi, Yoshihiko; Kohda, Toichi; and Yoshikawa, Shokichiro, 4,878,036, Cl. 333-195.000.

Nihon Radiator Co., Ltd.: *See—*
Hagikura, Hirofumi; and Kawamoto, Haruki, 4,878,001, Cl. 318-446.000.

Nike, Inc.: *See—*
Robinson, John R.; and Richard, Daniel J., 4,876,806, Cl. 36-114.000.

Nikko Co., Ltd.: *See—*
Aoki, Dai, 4,877,240, Cl. 273-1.0GA.

Nilarp, Anders, to International Rectifier Corporation. Metallizing system for semiconductor wafers. 4,878,099, Cl. 357-71.000.

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Kobayashi, Mitsuo, 4,877,212, Cl. 248-444.100.

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Nippon Mining Co., Ltd.: *See—*
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Moriya, Yasuo; Suzuki, Nobuyoshi; and Goto, Hiroshi, 4,877,841, Cl. 525-286.000.

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Nippon Petrochemicals Company, Limited: *See—*
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Chikamune, Kaoru; Tokuda, Manabu; Inoue, Kazuo; Utsunomiya, Kyoshi; and Hitofude, Yoshii, 4,877,456, Cl. 106-270.000.

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Nippon Steel Corporation: *See—*
Kakehi, Nobuo; Takahashi, Yuzuru; Higuchi, Norio; Izumihara, Yoshikazu; Matsumoto, Hiromi; and Uehori, Yuji, 4,876,874, Cl. 72-199.000.
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Nishida, Emiko: *See—*
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Nishida, Masami: *See—*
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Mori, Tatsuya; Ohsumi, Tadashi; Nakamura, Shigeo; Maeda, Kiyoto; Nishida, Sumio; and Takano, Hirotaka, 4,877,441, Cl. 71-90.000.

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Marume, Yoshihiro; and Iwamoto, Tadao, 4,877,215, Cl. 249-109.000.

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Nishimura, Tutomu: *See—*
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Nishimura, Yukinobu: *See—*
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Shimomura, Setsuhiro; and Nishiyama, Ryoji, 4,877,002, Cl. 123-339.000.

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Taniguchi, Masakazu; Hirose, Masayoshi; Baba, Masatoshi; Hirata, Kiminori; and Ochiai, Yoshinori, 4,877,787, Cl. 514-247.000.

Nissan Motor Co., Ltd.: *See—*
Hayasaki, Koichi, 4,876,925, Cl. 74-868.000.
Konishi, Junkichi; and Shiraishi, Yasuhiro, 4,877,263, Cl. 280-707.000.
Kurihara, Kenji, 4,876,911, Cl. 74-502.100.
Miwa, Kazunori, 4,877,968, Cl. 250-484.100.
Muro, Hideo, 4,877,951, Cl. 250-211.00J.

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Satoh, Hiroaki; Koyama, Hiroyasu; Suzuki, Yoshikuni; Sugai, Toshiji; and Watanabe, Koichi, 4,877,797, Cl. 514-314.000.

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Nixdorf Computer AG: *See—*
Esser, Wolfgang; and Jung, Peter, 4,878,009, Cl. 323-275.000.

NKK Corporation: *See—*
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Nobel Kemi AB: *See—*
Olsson, Mats, 4,876,962, Cl. 102-288.000.

Nobile, John R.; Ross, William A.; and Toth, William D., to Pitney Bowes Inc. Drive system for rotary printing apparatus including improved means for locking and unlocking the apparatus. 4,876,959, Cl. 101-233.000.

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Nodo, Kanji: *See—*
Tsuji, Masayoshi; Nakagawa, Akira; Inoue, Hisataka; Hachiya, Terumi; Tanoue, Yoshihiro; Ikesue, Kouichi; Saita, Masaru; Mizoguchi, Takenobu; Aoki, Testsuo; Sato, Hironobu; and Nodo, Kanji, 4,877,876, Cl. 544-133.000.

Nofre, Claude; Tinti, Jean M.; and Chatzopoulos, Farroudja O., to Universite Claude Bernard - Lyon 1. Glycine and β alanine derivatives as sweetening agents. 4,877,895, Cl. 558-413.000.

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Noguchi, Kunio; Koike, Yuzuru; and Toshimits, Kazushige, to Honda Giken Kogyo K.K. Air-fuel ratio control method for internal combustion engines. 4,877,006, Cl. 123-589.000.

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Noji, Minoru: *See—*
Yasumura, Hiroto; Hirasawa, Masahide; Noji, Minoru; Kozuki, Susumu; Takahashi, Koji; Yoshimura, Katsuji; and Sasatani, Tomohiko, 4,878,128, Cl. 358-315.000.

Nolan, Daniel A.: *See—*
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Noller, Christoph: *See—*
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Nollez, Jacques: *See—*
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Nomura, Ikuo: *See*—
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Nomura, Isao: *See*—
Masu, Masanobu; Yoshioka, Hiroshi; Kouno, Kenzi; Nomura, Isao; and Yamamiya, Kazuo, 4,877,847, Cl. 525-397.000.
Nomura, Yoshihisa: *See*—
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Noomer, Pieter J.: *See*—
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Norand Corporation: *See*—
Danielson, Arvin D.; and Durbin, Dennis A., 4,877,949, Cl. 235-462.000.
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Petit, Michele; Mortreux, Andre; Petit, Francis; and Buono, Gerard, 4,877,908, Cl. 568-814.000.
Northern Telecom Limited: *See*—
Caldwell, Kevin G.; Lischynsky, Steve J.; and Bagi, Elza V., 4,877,303, Cl. 350-96.210.
Gawargy, Mumtaz B., 4,878,244, Cl. 379-402.000.
Kubis, Leon S., 4,877,176, Cl. 228-173.500.
Marsden, Eric P.; and Checkland, John A., 4,877,467, Cl. 156-51.000.
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Wilson, Michael E., 4,877,654, Cl. 427-387.000.
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Riley, Gilbert N.; Holodnak, Richard S.; and Malin, Richard A., 4,876,956, Cl. 101-91.000.
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Pullig, Joe G., Jr. Manually operated spear apparatus. 4,877,085, Cl. 166-98.000.
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Putt, Francis G., to Kerr Machinery Corporation. Pump. 4,877,371, Cl. 415-169.100.
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Rhone-Poulenc Chimie: *See*—
Costantini, Michel; and Igersheim, Francoise, 4,877,903, Cl. 568-342.000.

Rhone-Poulenc Sante: *See*—
Ardaillon, Pierre; Autant, Pierre; Bourrain, Paul; and Cartillier, Andre, 4,877,621, Cl. 424-498.000.

Ribi ImmunoChem Research Inc.: *See*—
Cantrell, John L., 4,877,611, Cl. 424-88.000.

Ricciardelli, Robert H. Fiber optic light mode mixer. 4,877,305, Cl. 350-96.300.

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Robinson, John R.; and Richard, Daniel J., 4,876,806, Cl. 36-114.000.

Richards, Lee E. Knee pads. 4,876,745, Cl. 2-24.000.

Richardson, Christopher K., to Plessey Overseas Limited. Interference signal suppressor for a radio receiver. 4,878,251, Cl. 455-206.000.

Richardson, David. Compact signal enhancer. 4,878,254, Cl. 455-601.000.

Richardson, Glenn A.: *See*—
Feltz, Kevin L.; Richardson, Glenn A.; and Burrell, Jonathan C., 4,876,857, Cl. 60-734.000.

Richardson, Hubert, Jr.: *See*—
Johnson, William C.; and Richardson, Hubert, Jr., 4,877,381, Cl. 418-55.000.

Richer, LeRoy L., to Vestar, Inc. Liposomal vesicles for intraperitoneal administration of therapeutic agents. 4,877,619, Cl. 424-450.000.

Ricketts, John; and Grecu, George M. Thickness monitor for floated sludge. 4,876,888, Cl. 73-319.000.

Ricoh Company, Ltd.: *See*—
Arai, Atsushi, 4,878,092, Cl. 355-285.000.
Ikehira, Kimimasa; Wu, Ming-Chi; and Liu, Chih-Yuan, 4,878,117, Cl. 358-183.000.
Kinoshita, Mikio; Ohta, Wasaburo; and Miyabori, Toru, 4,876,984, Cl. 118-723.000.
Kishida, Daisuke; and Sasaki, Saburo, 4,878,081, Cl. 354-414.000.
Yokomori, Kiyoshi; and Isobe, Tami, 4,877,301, Cl. 350-96.190.

Ricoh Corporation: *See*—
Springer, Robert M.; Schmal, Richard L.; and Gavenman, Eugene H., 4,878,242, Cl. 379-204.000.

Riden, Joseph R.: *See*—
Neighbors, Ralph P.; and Riden, Joseph R., 4,877,806, Cl. 514-410.000.

Riecke, Edgar E.: *See*—
Chen, Chung Y.; Riecke, Edgar E.; Harbison, Kenneth G.; and Chapman, Derek D., 4,877,724, Cl. 430-621.000.

Rieter Machine Works Ltd.: *See*—
Nabulon, Werner, 4,877,570, Cl. 264-282.000.
Riley, Gilbert N.; Holodnak, Richard S.; and Malin, Richard A., to Pitney Bowes Inc. Removable postage meter having an indicia cover. 4,876,956, Cl. 101-91.000.
Riou, Claude R.; and Gidon, Georges M., to Societe Anonyme: Aussedat-Rey. Recording sheet for ink-jet printing and process for its preparation. 4,877,686, Cl. 428-514.000.
Ripert, Victor L., to Automatisme et Robotique Appliques -A.R.A. Clamp for fitting to a conveyor of an automatic cabling machine and intended to hold one or more electrically conductive wires. 4,877,228, Cl. 269-156.000.
Ritter, Joseph, to Nestec S.A. Distribution for forming a thin liquid layer on a surface. 4,877,188, Cl. 239-135.000.
Rival, Marc, to Merlin Gerin. Breaking device for multipole electrical circuit breaker with multiple contacts. 4,877,929, Cl. 200-146.00R.
Rivas, Olegario: *See*—
Lon, Jesus R.; Rivas, Olegario; and Zirczy, Geza N., 4,877,542, Cl. 252-62.000.
Rives, Robert L.: *See*—
Ditty, Jeffrey L.; Rives, Robert L.; Schanding, James T.; and Burka, Eric S., 4,876,787, Cl. 29-430.000.
Rizzo, Joseph F.: *See*—
Lin, Steve M.; and Rizzo, Joseph F., 4,878,240, Cl. 379-67.000.
RM Base Company: *See*—
Gefroh, James A.; and Hattman, Fredric J., 4,876,833, Cl. 52-107.000.
Robert Thomas Ltd.: *See*—
Frank, Glenn R.; and Stewart, Edward T., Jr., 4,877,399, Cl. 433-25.000.
Roberts, Joni A.: *See*—
Bleich, Larry L.; Roberts, Joni A.; and Zerbs, Stephen T., 4,877,645, Cl. 427-117.000.
Robertson, Harry W., IV, to Westvaco Corporation. Method and apparatus for unloading vapor adsorbers. 4,877,426, Cl. 55-74.000.
Robertson, Taggart H.: *See*—
Aranda, Michael A.; Ebbers, Timothy J.; Iida, Yoshio; Lindgren, Terence W.; and Robertson, Taggart H., 4,878,182, Cl. 364-518.000.
Robey, Herbert L., to Cyanide Destruct Systems, Inc. Reactor and heat exchanger system for cyanide waste water treatment. 4,877,519, Cl. 210-86.000.
Robinson, John R.; and Richard, Daniel J., to Nike, Inc. Asymmetric shoe. 4,876,806, Cl. 36-114.000.
Robinson, Keith J.: *See*—
Cassola, Adrian; Kwok, John C.; Robinson, Keith J.; Smith, Brian H. A.; and Longuet, Michel, 4,877,832, Cl. 525-64.000.
Robinson, Larry A.; and Robinson, Richard R., to Tidel Systems, Inc. Currency sorter and storage device. 4,877,235, Cl. 271-279.000.
Robinson, Richard R.: *See*—
Robinson, Larry A.; and Robinson, Richard R., 4,877,235, Cl. 271-279.000.
Robinson, William L., to United States of America, Army. 3-D packaging of focal plane assemblies. 4,877,752, Cl. 437-51.000.
Rockerath, John L.; and Blust, Dale K., to Figgie International Inc. Ball holding and cementing apparatus and method. 4,877,655, Cl. 427-430.100.
Rockwell International Corporation: *See*—
Gottesman, Jeffrey L.; Dempsky, Mark A.; Koch, Donald E.; and Rattan, Dev R., 4,878,048, Cl. 340-825.010.
Larsen, Robert P.; Hoelke, Steven T.; and Luisi, James A., 4,878,179, Cl. 364-490.000.
Loris, William P., 4,878,153, Cl. 361-394.000.
Page, George H., 4,877,959, Cl. 250-336.100.
Yeh, Pochi A., 4,877,297, Cl. 350-3.680.
Rodal, Jose J. A., to Beloit Corporation. Method of making a bearing blanket. 4,877,472, Cl. 156-184.000.
Rodder, Mark S., to Texas Instruments Incorporated. Method of forming silicides having different thicknesses. 4,877,755, Cl. 437-200.000.
Rodrigues, Renato S.; and Ogura, Jayme H., to Petroleo Brasileiro S.A. - Petrobras. Process and equipment for oil well drilling and completing operations in deep water. 4,877,088, Cl. 166-342.000.
ROFA Rosenheimer Forderanlagen GmbH: *See*—
Koslowski, Gunter; and Uttscheid, Georg, 4,876,965, Cl. 104-127.000.
Rogers, William P., to Telenex Corporation. Signal switching system. 4,878,215, Cl. 370-58.100.
Rohm GmbH: *See*—
Siol, Werner; Heil, Ernst; Wenzel, Franz; Arndt, Peter J.; and Terbrack, Ulrich, 4,877,853, Cl. 526-329.700.
Rohm GmbH Chemische Fabrik: *See*—
Gross, Heinz, 4,877,474, Cl. 156-244.130.
Rohm, Gunter H.; and Pesch, Karl, to Gunter Horst Rohm. Power-driven chuck. 4,877,259, Cl. 279-123.000.
Rohm and Haas Company: *See*—
Emmons, William D.; and Winkle, Mark R., 4,877,818, Cl. 522-26.000.
Swithenbank, Colin; and Fujimoto, Ted. T., 4,877,897, Cl. 560-021.000.
Rohr, Wolfgang: *See*—
Becker, Rainer; and Rohr, Wolfgang, 4,877,887, Cl. 549-253.000.
Rollei Fototechnic GmbH: *See*—
Wester-Ebbinghaus, Wilfried; Luhmann, Thomas; Mangelsdorf, Juergen; and Pini, Peter, 4,878,247, Cl. 382-1.000.
Rolloff, Paul D.; and Lamb, Reginald T., to Amfit Inc. System and method for forming custom-made shoe inserts. 4,876,758, Cl. 12-142.00N.
Rolscreen Company: *See*—
Hagemeyer, Bruce A., 4,876,838, Cl. 52-455.000.
Romano, Antonio, to Campagnolo S.p.A. Gear selector for bicycle speed gears. 4,876,913, Cl. 74-535.000.
Roquette Freres: *See*—
Leleu, Jean-Bernard; and LeMay, Patrick, 4,877,889, Cl. 549-292.000.
Rorden, Louis H.; and Moore, T. Charles, to Develco, Inc. Actuation method. 4,878,053, Cl. 340-853.000.
Rorer Pharmaceutical Corporation: *See*—
Felt, George R.; Multhauf, Donna K.; and Wagle, Sudhakar S., 4,876,891, Cl. 73-426.000.
Lee, Ted C. K.; and Hrinda, Michael E., 4,877,608, Cl. 424-85.800.
Rose, Frederick A. Communications management system. 4,878,196, Cl. 364-900.000.
Rosemount Inc.: *See*—
Schulte, John P.; Orth, Kelly M.; Frick, Roger L.; Westfield, Brian L.; and Paschke, Randy K., 4,878,012, Cl. 324-60.0CD.
Rosen, Stanley D.: *See*—
Crandall, Scott R.; Droste, Timothy A.; and Rosen, Stanley D., 4,876,923, Cl. 74-732.000.
Rosen, Vicki: *See*—
Wang, Elizabeth A.; Wozney, John M.; and Rosen, Vicki, 4,877,864, Cl. 530-324.000.
Ross, William A.: *See*—
Nobile, John R.; Ross, William A.; and Toth, William D., 4,876,959, Cl. 101-233.000.
Rossouw, Jan H.: *See*—
Rossouw, Pieter J.; and Rossouw, Jan H., 4,877,192, Cl. 241-275.000.
Rossouw, Pieter J.; and Rossouw, Jan H. Rotary impact crusher main wear tip. 4,877,192, Cl. 241-275.000.
Rothbard, Robert. Basketball hoop and net apparatus. 4,877,241, Cl. 273-1.50R.
Rouillon, Yves: *See*—
Donati, Jean R.; Guttmann, Daniele; Rouillon, Yves; Paul, Pierre S.; and Zacharie, Guy, 4,877,465, Cl. 148-428.000.
Rounds, Rhyta S., to Colgate-Palmolive Co. Polarizable material having a liquid crystal microstructure and electrical components produced therefrom. 4,878,150, Cl. 361-311.000.
Roussel, Michel; and Baffreau, Daniel, to Entreprise Gagneraud Pere & Fils; and Total Compagnie Francaise des Petroles. Compound cement, more particularly usable in bore holes. 4,877,452, Cl. 106-97.000.
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Clemence, Francois; Le Martret, Odile; Delevallee, Francoise; and Fortin, Michel, 4,877,796, Cl. 514-311.000.
Rovensky, Franz: *See*—
Binder, Dieter; Rovensky, Franz; and Ferber, Hubert P., 4,877,809, Cl. 514-444.000.
Rowlette, John R.: *See*—
Wu, Jeff C.; Williams, Richard T.; Rowlette, John R.; Brooks, Charles P.; and Zimmerman, Richard H., 4,877,644, Cl. 427-53.100.
Roy, Richard S., to Visic, Incorporated. Static ram with common data line equalization. 4,878,198, Cl. 365-222.000.
Rudeen, Richard D. Roof ventilator. 4,876,950, Cl. 98-42.210.
Rudnick, Dieter; Kothe, Norbert; Dichtelmuller, Herbert; Piechaczek, Detlef; Stephan, Wolfgang; and Schleussner, Hans, to Biotest Pharma GmbH. Method of producing a virus safe, storage-stable, and intravenously tolerable immunoglobulin-G preparation. 4,877,866, Cl. 530-387.000.
Ruesch, James R. Apparatus and methods for measuring the density of an unknown fluid using a Coriolis meter. 4,876,879, Cl. 73-32.00A.
Ruhland, John G.: *See*—
Grushkin, Bernard; Chang, Hui; and Ruhland, John G., 4,877,707, Cl. 430-106.600.
Runyon, John F. Folding modular building structure. 4,876,831, Cl. 52-70.000.
Rusche, Jochen: *See*—
Ballschuh, Detlef; Seibt, Horst; Ohme, Roland; Rusche, Jochen; Gruendemann, Egon; and Krause, Elke, 4,877,885, Cl. 548-570.000.
Rush, Jonathan E.; Scalvini, Phillip D.; and Gerber, Reinhold. Snap-on lid and mold for making the lid. 4,877,151, Cl. 206-514.000.
Russwurm, Dieter: *See*—
Aicher, Max; Jungwirth, Dieter; Klein, Hans-Wilhelm; and Russwurm, Dieter, 4,877,463, Cl. 148-12.00B.
Ruthenberg, Klaus: *See*—
Muller, Friedhelm; and Ruthenberg, Klaus, 4,877,328, Cl. 366-76.000.
Ruttel, Martin: *See*—
Drews, Wolf-Dietrich; Van Der Linden, Klaus; Ruttel, Martin; and Friedrich, Jurgen, 4,877,989, Cl. 310-323.000.
Ryba, Steven M.: *See*—
Hopper, Roger J.; Shah, Niranjan V.; and Ryba, Steven M., 4,877,901, Cl. 564-82.000.
Ryham, Rolf, to Ahlstromforetagen Svenska AB. Process and apparatus for cooling a fluid. 4,877,080, Cl. 165-2.000.
Rzeszotarski, Waclaw J.; Guzewska, Maria E.; Carter, John P.; Adams, Theodore C.; Dupont, Andrea C.; and Kaiser, Carl, to Marion Laboratories, Inc. 2-aminomethylalkynylalkyl-1,3-dithiane derivatives. 4,877,779, Cl. 514-63.000.

S.G.S. Thomson Microelectronics, S.A.: *See*—
Bergemont, Albert; and Ferrant, Richard, 4,877,483, Cl. 156-653.000.

S-Thomson Microelectronics S.p.A.: *See*—
Botti, Edoardo; Torazzina, Aldo; and Stefani, Fabrizio, 4,878,032, Cl. 330-263.000.

Saab Instruments Aktiebolag: *See*—
Nilsson, Hans-Arne, 4,876,942, Cl. 89-41.220.

Sachs, Klaus, to Anton Piller GmbH & Co. KG. Semiconductor circuit packages for use in high power applications and method of making the same. 4,878,106, Cl. 357-72.000.

Saeki, Chikara; and Nishibe, Minoru, to Kabushiki Kaisha Kobe Seiko Sho. Inner grooving process for a metallic tube. 4,876,869, Cl. 72-68.000.

Sagawa, Shizuo. Pin for sweepers. 4,876,761, Cl. 15-104.061.

Saggers, Michael J. Vibratory diaphragm pumps. 4,877,378, Cl. 417-299.000.

Sagi, Nobuo: *See*—
Koyano, Tetsuo; Sagi, Nobuo; Izumi, Tsugio; Fujita, Setsuya; Murata, Tadahiko; Hachiya, Iwao; and Mori, Hiroyuki, 4,877,636, Cl. 426-607.000.

Sago, Akira: *See*—
Hayakawa, Kiyoharu; Matsumoto, Yumio; Ueda, Masashi; Sago, Akira; and Tagaki, Osamu, 4,878,084, Cl. 355-27.000.

Sahakian, Jack A., to W. L. Gore & Associates, Inc. Sensors for detecting and locating liquid leaks. 4,877,923, Cl. 174-11.00R.

Saint-Amand, Elmer F. Swab transport system. 4,877,036, Cl. 128-749.000.

Saita, Masaru: *See*—
Tsuji, Masayoshi; Nakagawa, Akira; Inoue, Hisataka; Hachiya, Terumi; Tanoue, Yoshihiro; Ikesue, Kouichi; Saita, Masaru; Mizoguchi, Takenobu; Aoki, Testsuo; Sato, Hironobu; and Nodo, Kanji, 4,877,876, Cl. 544-133.000.

Saito, Hitoshi: *See*—
Higuchi, Kumao; Morinaga, Akio; Seshimo, Masahiro; and Saito, Hitoshi, 4,877,665, Cl. 428-36.100.

Saito, Tamio; and Yosihara, Kunio, to Kabushiki Kaisha Toshiba. Semiconductor integrated circuit device. 4,878,098, Cl. 357-68.000.

Saito, Yushi: *See*—
Yanagawa, Moriyuki; Ishida, Shunichi; Ogura, Ken; and Saito, Yushi, 4,877,496, Cl. 204-44.200.

Saitou, Shirou: *See*—
Tanaka, Yoshio; and Saitou, Shirou, 4,877,964, Cl. 250-455.100.

Sakae, Shigeru: *See*—
Kiyohara, Kazuto; Hagiwara, Toshiyuki; Nakadate, Takanori; Harada, Ichiya; Noguchi, Kentaro; Sakae, Shigeru; and Okuma, Kazuhiro, 4,877,819, Cl. 523-200.000.

Sakai, Akira: *See*—
Matsuyama, Jinsho; Hirai, Yutaka; Ueki, Masao; and Sakai, Akira, 4,877,650, Cl. 427-248.100.

Sakai: Fukumi: *See*—
Urushizaki, Sueo; Ohta, Yasuo; Sato, Mamoru; Sakai: Fukumi; and Nishiyama, Koushi, 4,877,730, Cl. 435-132.000.

Sakai, Haruki: *See*—
Nakagawa, Koji; Takagi, Takeo; Abe, Yoshiaki; and Sakai, Haruki, 4,877,370, Cl. 415-148.000.

Sakai, Shigekazu, to Tokai Shoji Co., Ltd.; and Tokai Seiki Co., Ltd. Apparatus for applying an emulsion screen film of screen-printing. 4,876,957, Cl. 101-128.400.

Sakai, Toshiyuki; and Sakata, Toshio, to Minolta Camera Kabushiki Kaisha. Image forming apparatus with jam removal mechanism. 4,878,087, Cl. 355-207.000.

Sakaki, Mamoru; Arai, Ryuichi; Akiya, Takashi; Toganoh, Shigeo; Higuma, Masahiko; Eto, Naonobu; Mouri, Hidemasa; Tobita, Michiaki; Ishida, Masahiko; and Kono, Shunzo, to Canon Kabushiki Kaisha. Recording medium with non-porous ink-receiving layer. 4,877,680, Cl. 428-332.000.

Sakakibara, Tadao: *See*—
Futatsuka, Rensei; Chiba, Synu-ichi; and Sakakibara, Tadao, 4,877,577, Cl. 420-473.000.

Sakamaki, Hisashi: *See*—
Shimizu, Katsuichi; Masuda, Shunichi; Yagasaki, Toshiaki; and Sakamaki, Hisashi, 4,878,130, Cl. 358-400.000.

Sakata, Motohide: *See*—
Kobayashi, Ichiji; and Sakata, Motohide, 4,877,537, Cl. 210-747.000.

Sakata, Toshio: *See*—
Sakai, Toshiyuki; and Sakata, Toshio, 4,878,087, Cl. 355-207.000.

Sakata, Tsuguhide; Taguchi, Tomishige; Kimura, Norio; Tsuruno, Kunio; and Suzuki, Yasutomo, to Canon Kabushiki Kaisha. Reproducing apparatus. 4,878,131, Cl. 360-37.100.

Samreth, Soth; Bellamy, Francois; and Millet, Jean, to Fournier Innovation et Synergie. Novel β-D-phenylthioxylosides, their method of preparation and their use as therapeutics. 4,877,808, Cl. 514-432.000.

Samsung Electronics Co., Ltd.: *See*—
Cho, Hae S.; and Kwon, In K., 4,876,763, Cl. 15-329.000.

Samuelsen, Per R.: *See*—
Albrigtsen, Rolf H.; and Samuelsen, Per R., 4,877,046, Cl. 137-107.000.

Sandberg, Inga H.: *See*—
Andersson, Lars-Olof; Forsman, Nanna; Larsen, Kerstin E. I.; Lundin, Annelie B.; Pavlu, Bohdan; Sandberg, Inga H.; and Sewerin, Karin M., 4,877,614, Cl. 424-101.000.

Sanden Corporation: *See*—
Negishi, Kozaburo, 4,876,860, Cl. 62-179.000.
Tamura, Yasuji, 4,877,118, Cl. 192-103.00R.

Sandhaus, Jeffrey, to Vastech Medical Products Inc. Apparatus for effecting occlusion of the vas deferens. 4,877,028, Cl. 128-326.000.

Sandor, Nagy: *See*—
Gabor, Szoradi; and Sandor, Nagy, 4,878,007, Cl. 320-14.000.

Sandoz Ltd.: *See*—
Carney, Robert L.; and Brown, Thomas L., 4,877,899, Cl. 560-262.000.
Pedrazzi, Reinhard, 4,877,412, Cl. 8-437.000.

Sanki Engineering, Ltd.: *See*—
Nunogaki, Yoshiaki, 4,877,523, Cl. 210-198.200.

Sano, Sachiya: *See*—
Kawase, Toshihiro; and Sano, Sachiya, 4,877,931, Cl. 200-308.000.

Sano, Yoshitaka: *See*—
Kotera, Masahide; Konishi, Motofumi; Ando, Yoshio; Iwaya, Toshio; Tanaka, Kanou; Hashimoto, Norio; Sugita, Yasutoshi; Sano, Yoshitaka; and Ono, Satoshi, 4,878,250, Cl. 382-56.000.

Santel, Hans-Joachim: *See*—
Gehring, Reinhold; Schallner, Otto; Stetter, Jorg; Santel, Hans-Joachim; Schmidt, Robert R.; and Strang, Harry, 4,877,439, Cl. 71-86.000.
Schwamborn, Michael; Klauke, Erich; Schmidt, Robert R.; Santel, Hans-Joachim; and Strang, Robert H., 4,877,443, Cl. 71-92.000.

Santha, Pal: *See*—
Neu Jozsef; Csatlos, Imre; Varga, Andras; Suranyi, Robert; Ilovai, Zoltan; Gaal, Sandor; Karsai, Jozsef; Sebestyen, Endre; Gardi, Eva; Siki, Karoly; Toth, Istvan; Gal, Guszt/e,acu/a/ v; Dombay, Zsolt; Grega nee Toth, Mrs. Erzsebet; Pavliscsak, Csaba; Tarpai, Gyula; Bonnyay, Peter; and Santha, Pal, 4,877,893, Cl. 558-86.000.

Saperstein, Z. Philip, to Modine Manufacturing Company. Brazed heat exchanger and method of making the same. 4,877,083, Cl. 165-176.000.

Sarraf, Raymond E.; and Zaharris, Daniel R., to MiniScribe Corporation. Track crossing detector. 4,878,136, Cl. 360-78.040.

Sasaki, Hidemi: *See*—
Ando, Shigeru; and Sasaki, Hidemi, 4,878,138, Cl. 360-99.020.

Sasaki, Isao; Kushi, Kenji; and Taguchi, Nobuyoshi, to Mitsubishi Rayon Company, Ltd. Composition easily dyeable with sublimable desperse dye. 4,877,922, Cl. 528-272.000.

Sasaki, Saburo: *See*—
Kishida, Daisuke; and Sasaki, Saburo, 4,878,081, Cl. 354-414.000.

Sasatani, Tomohiko: *See*—
Yasumura, Hiroto; Hirasawa, Masahide; Noji, Minoru; Kozuki, Susumu; Takahashi, Koji; Yoshimura, Katsuji; and Sasatani, Tomohiko, 4,878,128, Cl. 358-315.000.

Sassella, Christopher D., to Dowell Australia Limited. Combination lock. 4,876,864, Cl. 70-89.000.

Sassella, Christopher D.; Whitney, John R.; and McGeehan, Harold K., to Dowell Australia Ltd. Apparatus for machining a work piece and a jig assembly for holding the work piece. 4,877,227, Cl. 269-43.000.

Sato, Akira: *See*—
Fuyama, Moriaki; Tamura, Katsumi; Taguchi, Kazuo; Onisawa, Kenichi; Sato, Akira; Hashimoto, Kenichi; Nakayama, Takahiro; and Abe, Yoshio, 4,877,994, Cl. 313-503.000.
Murakata, Chikara; Sato, Akira; Kasai, Masaji; Kobayashi, Eiji; Morimoto, Makoto; and Akinaga, Shiro, 4,877,776, Cl. 514-43.000.

Sato, Hironobu: *See*—
Tsuji, Masayoshi; Nakagawa, Akira; Inoue, Hisataka; Hachiya, Terumi; Tanoue, Yoshihiro; Ikesue, Kouichi; Saita, Masaru; Mizoguchi, Takenobu; Aoki, Testsuo; Sato, Hironobu; and Nodo, Kanji, 4,877,876, Cl. 544-133.000.

Sato, Kozo; Ohno, Shigeru; and Yamada, Sumito, to Fuji Photo Film Co., Ltd. Silver halide photographic material. 4,877,720, Cl. 430-512.000.

Sato, Mamoru: *See*—
Urushizaki, Sueo; Ohta, Yasuo; Sato, Mamoru; Sakai: Fukumi; and Nishiyama, Koushi, 4,877,730, Cl. 435-132.000.

Sato, Masaaki: *See*—
Tanaka, Susumu; Sato, Masaaki; Kaeriyama, Kyoji; Suda, Yoshio; and Hiraide, Takao, 4,877,852, Cl. 526-256.000.

Sato, Ryo: *See*—
Enomoto, Masayuki; Nagano, Eiki; Haga, Toru; Morita, Kouichi; and Sato, Ryo, 4,877,444, Cl. 71-92.000.

Satoh, Hiroaki; Koyama, Hiroyasu; Suzuki, Yoshikuni; Sugai, Toshiji; and Watanabe, Koichi, to Nisshin Flour Milling Co., Ltd. 1,4-Dihydropyridine derivatives and pharmaceutical compositions containing same. 4,877,797, Cl. 514-314.000.

Satoh, Yasuo: *See*—
Senoo, Hideaki; Yamasaki, Takeshi; Satoh, Yasuo; and Sugaya, Mamoru, 4,877,688, Cl. 428-522.000.

Sauer, Harald: *See*—
Von Jordan, Wenzel; Draf, Rolf; Grone, Dieter; and Sauer, Harald, 4,877,598, Cl. 423-640.000.

Sauerbaum, Thomas; and Kahning, Stefan, to Draegerwerk Aktiengesell Schaft. Method and apparatus for measuring the dew point of a gas. 4,877,329, Cl. 374-28.000.

Sauers, Marvin E.; Hartsing, Tyler F., Jr.; and McMaster, Lee P., to Amoco Corporation. Laminates containing coextruded scrap. 4,877,682, Cl. 428-412.000.

Saulle, Lorenzo, to Stacos di Saulle Lorenzo e Pontarollo Luciana s.n.c. Dispenser for fluid products. 4,877,157, Cl. 222-387.000.

Saulnier, Gary J.; Herrera, Randy G.; and Thiel, Timothy E., to General Electric Company. Complex digital sampling converter for demodulator. 4,878,029, Cl. 329-341.000.

Sauzade, Jean-Denis; and L'Hote, Manuel, to Thomson-CSF. Mounting for printed circuits forming a heat sink with controlled expansion. 4,878,152, Cl. 361-386.000.

Sawa, Masahiko: *See*—
Ando, Makoto; Kakinuma, Koichiro; Sawa, Masahiko; Ohmuro, Hideaki; and Ohryo, Akira, 4,877,946, Cl. 235-380.000.

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Sawamura, Masashi: *See*—
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Gregory, Joseph A.; and Schaum, David L., 4,877,204, Cl. 248-298.000.

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Maly, Friedrich E.; de Week, Alain L.; and Henderson, David, 4,877,742, Cl. 436-65.000.

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Kula, Maria-Regina; Hummel, Werner; Schutte, Horst; and Leuchtenberger, Wolfgang, 4,877,734, Cl. 435-228.000.

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Seitz, H. Michael, Jr. Disposable needle guide and examination sheath for transvaginal ultrasound procedures. 4,877,033, Cl. 128-660.050.
Seki, Nagataka; Ogawa, Kiyoshi; and Nakajima, Kihei, to Kabushiki Kaisha Toshiba. Voltage-phase responsive, inverter disable circuit for system interconnection. 4,878,208, Cl. 307-87.000.
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Nakatsugawa, Kenji; Katayama, Aiichi; and Sekiya, Hitoshi, 4,878,194, Cl. 364-900.000.
Selling, John A.: *See—*
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Selman, Steven H.: *See—*
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Senoo, Hideaki; Yamasaki, Takeshi; Satoh, Yasuo; and Sugaya, Mamoru, to Mitsubishi Paper Mills, Ltd. Ink-jet recording sheet. 4,877,688, Cl. 428-522.000.
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Fukuda, Takuya; Mochizuki, Yasuhiro; Momma, Naohiro; Takahashi, Shigeru; Suzuki, Noboru; Sonobe, Tadasi; Chiba, Kiyosi; and Suzuki, Kazuo, 4,876,983, Cl. 118-722.000.
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Shah, Niranjan V.: *See—*
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Shakbar Investments Ltd.: *See—*
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Shapiro, Jay: *See—*
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Morimoto, Taiji; Hosoba, Hiroyuki; Matsumoto, Mitsuhiro; Taneya, Mototaka; and M..ui, Sadayoshi, 4,878,223, Cl. 372-50.000.
Takakura, Masaki; Hayasaki, Hideto; Takemura, Hideo; Izumi, Masao; Iwasaki, Keisuke; Noguchi, Yoji; Yamane, Yasukuni; and Kako, Noritoshi, 4,878,178, Cl. 364-521.000.
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Shaw, Michael, to Dunlop Limited a British Company. Golf balls. 4,877,252, Cl. 273-232.000.
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Sheehy, Patrick K., to P K Airway Limited. Airway. 4,877,024, Cl. 128-207.140.
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Dewitz, Thomas S., 4,877,419, Cl. 48-197.00R.
Rhodes, Robert B., 4,877,836, Cl. 525-89.000.
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van Broekhoven, Adrianus M.; and Wife, Richard L., 4,877,860, Cl. 528-392.000.
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Shepard, Mary E.; Galloway, Deane E.; and Lind, Keith D., to American National Can Company. Nylon carrier for polymer concentrate, and films and packages made with the concentrate. 4,877,684, Cl. 428-475.800.
Sherman, Fred P., to Baker Cummins Pharmaceuticals, Inc. Method of treatment for interestitial cystitis. 4,877,791, Cl. 514-282.000.
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Shibano, Teruo: *See—*
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Shih, Meng-Fu; Cochran, Mark D.; and Macdonald, Richard D., to PruTech Research and Development Partnership. Attenuated pseudorabies virus which has a deletion in at least a portion of a repeat sequence and vaccine containing same. 4,877,737, Cl. 435-235.000.
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Shimada, Michio, to NEC Corporation. Error-correcting decoder for rapidly dealing with buffer overflow. 4,878,221, Cl. 371-43.000.
Shimizu, Chiyuki: *See—*
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Shimizu, Hisashi: *See—*
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Shimizu, Isamu: *See—*
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Shimizu, Katsuichi; Masuda, Shunichi; Yagasaki, Toshiaki; and Sakamaki, Hisashi, to Canon Kabushiki Kaisha. Reproduction apparatus. 4,878,130, Cl. 358-400.000.

Shimizu, Yasuo, to Honda Giken Kogyo Kabushiki Kaisha. Motor-operated power steering apparatus. 4,878,004, Cl. 318-599.000.
Shimizu, Yuzuru, to Mitsubishi Denki Kabushiki Kaisha. Rotor of magnetic generator. 4,877,986, Cl. 310-153.000.
Shimokawa, Masao; and Hamada, Hisanori, to Shikoku Kakoki Co., Ltd. Apparatus for distributedly filling particulate or granular material into containers. 4,877,067, Cl. 141-129.000.
Shimomura, Setsuhiro; and Nishiyama, Ryoji, to Mitsubishi Denki Kabushiki Kaisha. Electronic control device for internal-combustion engines. 4,877,002, Cl. 123-339.000.
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Shin-Etsu Chemical Co., Ltd.: *See—*
Itoh, Kunio; Shiobara, Toshio; Futatsumori, Koji; Tomiyoshi, Kazutoshi; and Shimizu, Hisashi, 4,877,822. Cl. 523-433.000.
Shin-Etsu Polymer Co., Ltd.: *See—*
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Shindo, Yoshikazu: *See—*
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Shinko Electric Co., Ltd.: *See—*
Karita, Mitsuji, 4,876,765, Cl. 16-102.000.
Shinohara, Isao, to Casio Computer Co., Ltd. Electronic musical instrument with automatic performing function. 4,876,938, Cl. 84-611.000.
Shinozaki, Fumiaki: *See—*
Namiki, Tomizo; Suzuki, Kazuo; and Shinozaki, Fumiaki, 4,877,712, Cl. 430-256.000.
Shinpo Kabushiki Kaisha: *See—*
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Itoh, Kunio; Shiobara, Toshio; Futatsumori, Koji; Tomiyoshi, Kazutoshi; and Shimizu, Hisashi, 4,877,822, Cl. 523-433.000.
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Shirai, Kenji; and Nomura, Yoshihisa, to Toyota Jidosha Kabushiki Kaisha. Tandem master cylinder with booster piston at pedal-remote end of master cylinder and with booster-pressure responsive reservoir valve for forward brake circuit. 4,876,853, Cl. 60-547.100.
Shirai, Koji; and Kawamura, Ken, to Kabushiki Kaisha Toshiba. Semiconductor device IC with DMOS using self-aligned back gate region. 4,878,096, Cl. 357-42.000.
Shiraishi, Takashi, to Kabushiki Kaisha Toshiba. Beam scanner with distortion correction. 4,878,066, Cl. 346-108.000.
Shiraishi, Yasuhiro: *See—*
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Shirtum, Robert P.; and Darby, Elaine B., to Dow Chemical Company, The. Preparation of epoxy resins. 4,877,857, Cl. 528-95.000.
Shishkin, Viktor V.; Kryazhevskikh, Nikolai F.; and Shapovalov, Jury P. Flexible hose pump. 4,876,946, Cl. 92-93.000.
Shkedi, Zvi: *See—*
Arabia, F. Gene; Shkedi, Zvi; and Brandt, Randy L., 4,876,892, Cl. 73-718.000.
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Suda, Yoshio: *See*—
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Suematsu, Tetsuya: *See*—
Fukuda, Kenichi; Mori, Takashi; Kurauchi, Yasuhiro; Doi, Masaharu; and Suematsu, Tetsuya, 4,877,498, Cl. 204-86.000.
Suetani, Kazuhisa: *See*—
Nakanishi, Akio; Hino, Toshio; Iino, Yoshio; Suetani, Kazuhisa; Houki, Yoji; and Ikuta, Hirotoshi, 4,878,088, Cl. 355-244.000.
Sueyoshi, Tohru: *See*—
Oda, Shohei; Seshimoto, Osamu; Sueyoshi, Tohru; and Amano, Hiroyuki, 4,877,582, Cl. 422-68.000.
Sugai, Toshiji: *See*—
Satoh, Hiroaki; Koyama, Hiroyasu; Suzuki, Yoshikuni; Sugai, Toshiji; and Watanabe, Koichi, 4,877,797, Cl. 514-314.000.
Suganuma, Nobuo: *See*—
Uematsu, Michio; and Suganuma, Nobuo, 4,877,602, Cl. 424-49.000.
Sugata, Yoshinobu: *See*—
Kuroda, Masami; Hattori, Yoshimasa; Furusho, Noboru; and Sugata, Yoshinobu, 4,877,703, Cl. 430-76.000.
Sugawara, Akira: *See*—
Fukuda, Takeshi; Yamazaki, Shunpei; and Sugawara, Akira, 4,877,481, Cl. 156-643.000.
Sugaya, Mamoru: *See*—
Senoo, Hideaki; Yamasaki, Takeshi; Satoh, Yasuo; and Sugaya, Mamoru, 4,877,688, Cl. 428-522.000.
Sugita, Heiji, to Sugita Wire Mfg. Co., Ltd. Process for producing oil quench hardening and tempering and hard drawn steel wire of shaped section. 4,877,462, Cl. 148-12.00B.
Sugita Wire Mfg. Co., Ltd.: *See*—
Sugita, Heiji, 4,877,462, Cl. 148-12.00B.
Sugita, Yasutoshi: *See*—
Kotera, Masahide; Konishi, Motofumi; Ando, Yoshio; Iwaya, Toshio; Tanaka, Kanou; Hashimoto, Norio; Sugita, Yasutoshi; Sano, Yoshitaka; and Ono, Satoshi, 4,878,250, Cl. 382-56.000.
Sugiyama, Isao: *See*—
Hasegawa, Masamitsu; Tamura, Satoshi; Wakashima, Takashi; and Sugiyama, Isao, 4,877,678, Cl. 428-216.000.
Sugiyama, Shigeru: *See*—
Okuno, Osamu; and Sugiyama, Shigeru, 4,877,308, Cl. 350-276.00R.
Sukamoto, Takayuki: *See*—
Iemura, Ryuichi; Hori, Manabu; Ohtaka, Hiroshi; Sukamoto, Takayuki; Hara, Hideaki; and Ito, Keizo, 4,877,790, Cl. 514-260.000.
Sukeforth, Carl J.: *See*—
du Pont, Benjamin F.; and Sukeforth, Carl J., 4,877,407, Cl. 434-302.000.
Suling, Carlhans: *See*—
Kausch, Michael; Buysch, Hans-Josef; Schroer, Hans; and Suling, Carlhans, 4,877,825, Cl. 524-101.000.
Sullivan, James C.: *See*—
Epperly, William R.; O'Leary, John H.; Sullivan, James C.; and Sprague, Barry N., 4,877,590, Cl. 423-235.000.
Epperly, William R.; and Sullivan, James C., 4,877,591, Cl. 423-235.000.
Sumida, Isao: *See*—
Suzuki, Hiroaki; Kataoka, Yoshiyuki; Murase, Michio; Inoue, Kotaro; Sumida, Isao; Yamanari, Shozo; Matsumoto, Masaki; Miura, Satoshi; and Hashimoto, Koji, 4,877,574, Cl. 376-216.000.
Sumitomo Chemical Company, Limited: *See*—
Enomoto, Masayuki; Nagano, Eiki; Haga, Toru; Morita, Kouichi; and Sato, Ryo, 4,877,444, Cl. 71-92.000.

Mori, Tatsuya; Ohsumi, Tadashi; Nakamura, Shigeo; Maeda, Kiyoto; Nishida, Sumio; and Takano, Hirotaka, 4,877,441, Cl. 71-90.000.
Suzukamo, Gohfu; and Fukao, Masami, 4,877,918, Cl. 585-664.000.
Sumitomo Electric Industries, Ltd.: *See*—
Yoshino, Masato, 4,877,295, Cl. 303-109.000.
Sumitomo Naugatuck Co., Ltd.: *See*—
Kondo, Masatsune; Ogura, Kiyoshi; and Kuramoto, Koiti, 4,877,833, Cl. 525-64.000.
Sumitomo Rubber Industries, Ltd.: *See*—
Tanigawa, Motoshi; Dohi, Hidehiko; Nishimura, Takashi; Ichikawa, Kouji; and Koishi, Tetsuo, 4,877,071, Cl. 152-165.000.
Sun Refining and Marketing Company: *See*—
Lush, Richard A.; and Tsao, Hsiang-Wei, 4,877,920, Cl. 585-823.000.
Sunds Defibrator Jylha Oy: *See*—
Karna, Juhani; and Pahlman, Heikki, 4,878,020, Cl. 324-207.000.
Sundstrand Corporation: *See*—
Jones, Teddy L., 4,876,906, Cl. 74-89.150.
Owens, William R., 4,876,854, Cl. 60-641.800.
Sundstrand Heat Transfer, Inc.: *See*—
Hill, David T., 4,877,087, Cl. 165-181.000.
Sung, Rodney L.: *See*—
Kapuscinski, Maria M.; Grina, Larry D.; Jones, Ronald E.; and Sung, Rodney L., 4,877,415, Cl. 44-62.000.
Sunohara, Izuru: *See*—
Katayama, Akihiro; Ohsawa, Hidefumi; Sunohara, Izuru; Hosokawa, Hiroshi; and Yoshimoto, Masahiko, 4,878,125, Cl. 358-443.000.
Sunstrand Corp.: *See*—
Tysver, John D.; and Grimm, Duane, 4,877,120, Cl. 192-141.000.
Suntory Limited: *See*—
Maeda, Shigeyoshi; Asai, Tsunetoshi; Asano, Hidejiro; and Taguchi, Haruyoshi, 4,877,664, Cl. 428-35.900.
Suranyi, Robert: *See*—
Neu Jozsef; Csatlos, Imre; Varga, Andras; Suranyi, Robert; Ilovai, Zoltan; Gaal, Sandor; Karsai, Jozsef; Sebestyen, Endre; Gardi, Eva; Siki, Karoly; Toth, Istvan; Gal, Guszt/e,acu/a/ v; Dombay, Zsolt; Grega nee Toth, Mrs. Erzsebet; Pavliscsak, Csaba; Tarpai, Gyula; Bonnyay, Peter; and Santha, Pal, 4,877,893, Cl. 558-86.000.
Susumu Corporation, Ltd.: *See*—
Fukushima, Itaru; Okamoto, Takashi; and Deguchi, Hisashi, 4,878,065, Cl. 346-76.0PH.
Suzukamo, Gohfu; and Fukao, Masami, to Sumitomo Chemical Company, Ltd. Process for preparing internal olefins. 4,877,918, Cl. 585-664.000.
Suzuki, Akinori; Kajita, Toshio; and Furushima, Masakazu, to Mitsubishi Gas Chemical Company, Inc. Method and composition for increasing harvests of crops. 4,877,447, Cl. 71-103.000.
Suzuki, Hideo, to Yamaha Corporation. Apparatus for producing rhythmically aligned tones from stored wave data. 4,876,937, Cl. 84-612.000.
Suzuki, Hiroaki; Kataoka, Yoshiyuki; Murase, Michio; Inoue, Kotaro; Sumida, Isao; Yamanari, Shozo; Matsumoto, Masaki; Miura, Satoshi; and Hashimoto, Koji, to Hitachi, Ltd.; and Hitachi Engineering Co., Ltd. Method of and apparatus for controlling power of natural circulation reactor. 4,877,574, Cl. 376-216.000.
Suzuki, Kazuo: *See*—
Fukuda, Takuya; Mochizuki, Yasuhiro; Momma, Naohiro; Takahashi, Shigeru; Suzuki, Noboru; Sonobe, Tadasi; Chiba, Kiyosi; and Suzuki, Kazuo, 4,876,983, Cl. 118-722.000.
Namiki, Tomizo; Suzuki, Kazuo; and Shinozaki, Fumiaki, 4,877,712, Cl. 430-256.000.
Suzuki, Masanori; and Tateishi, Kiyoshi, to Pioneer Electronic Corporation. Method and apparatus for correcting the loop gain of a servo loop in accordance with measurements during open-loop operation. 4,878,211, Cl. 369-44.000.
Suzuki, Noboru: *See*—
Fukuda, Takuya; Mochizuki, Yasuhiro; Momma, Naohiro; Takahashi, Shigeru; Suzuki, Noboru; Sonobe, Tadasi; Chiba, Kiyosi; and Suzuki, Kazuo, 4,876,983, Cl. 118-722.000.
Suzuki, Nobuyoshi: *See*—
Moriya, Yasuo; Suzuki, Nobuyoshi; and Goto, Hiroshi, 4,877,841, Cl. 525-286.000.
Suzuki, Shinichi: *See*—
Kanamaru, Tatsuya; Nakayama, Motohiro; Arai, Katutoshi; Suzuki, Shinichi; and Naka, Ryoichi, 4,877,494, Cl. 204-28.000.
Suzuki, Sizuo: *See*—
Morioka, Takayuki; Motoyama, Nobuyuki; Hoshikawa, Hiroshi; Takahashi, Takeo; Suzuki, Sizuo; Ishikawa, Tuyoshi; Toyoshi, Takanori; and Uede, Toshio, 4,877,558, Cl. 252-626.000.
Suzuki, Toshiharu: *See*—
Kitano, Kisei; Ushioda, Makoto; Uchida, Manabu; and Suzuki, Toshiharu, 4,877,548, Cl. 252-299.630.
Suzuki, Toshihiro; Todokoro, Yasuyuki; and Komenou, Kazunari, to Fujitsu Limited. Process for the production of optical elements. 4,877,717, Cl. 430-321.000.
Suzuki, Yasuhiro; Remington, Jack S.; Desmonts, Georges; and Thuliez, Philippe, to Research Institute of Palo Alto Medical Foundation. Method for the detection of acute-phase toxoplasma infection. 4,877,726, Cl. 435-7.000.
Suzuki, Yasutomo: *See*—
Sakata, Tsuguhide; Taguchi, Tomishige; Kimura, Norio; Tsuruno, Kunio; and Suzuki, Yasutomo, 4,878,131, Cl. 360-37.100.
Suzuki, Yoshikuni: *See*—
Satoh, Hiroaki; Koyama, Hiroyasu; Suzuki, Yoshikuni; Sugai, Toshiji; and Watanabe, Koichi, 4,877,797, Cl. 514-314.000.
Suzuki, Yoshinobu: *See*—
Tsuda, Yusuke; Kurata, Takashi; Suzuki, Yoshinobu; and Yamamoto, Yuji, 4,877,835, Cl. 525-67.000.
Suzuki, Yoshiyuki, to Canon Kabushiki Kaisha. Beam recorder having a varying beam intensity for maintaining a true reproduced image. 4,878,068, Cl. 346-108.000.
Suzuki, Yukio: *See*—
Yaso, Masao; Suzuki, Yukio; Shibata, Kensuke; and Hayashi, Eiichi, 4,877,875, Cl. 544-116.000.
Yaso, Masao; Suzuki, Yukio; Shibata, Kensuke; and Hayashi, Eiichi, 4,877,877, Cl. 544-354.000.
Svarre, Erik: *See*—
Jensen, Niels D.; and Svarre, Erik, 4,877,372, Cl. 415-199.100.
Svensson, E. Gunnar, to Autopart Sweden AB. Sun visor assembly for motor vehicles, with an illuminated rear-view mirror. 4,878,158, Cl. 362-140.000.
Swain, Howard L.: *See*—
Carp, Stuart L.; Swain, Howard L.; and Nguyen, Bich N., 4,878,027, Cl. 328-15.000.
SWF Auto-Electric GmbH: *See*—
Andrei-Alexandru, Marcel; Bayha, Heiner; Bruhn, Rainer; and Maier, Iris, 4,876,909, Cl. 74-411.500.
Swing-Matic AB: *See*—
Schetl, Laszlo, 4,877,290, Cl. 297-270.000.
Swiss Aluminium Ltd.: *See*—
Widrig, Jakob; and Wulff, Gunther, 4,876,825, Cl. 49-502.000.
Swithenbank, Colin; and Fujimoto, Ted. T., to Rohm and Haas Company. 4-Trifluoromethyl-4'-nitrodiphenyl ethers. 4,877,897, Cl. 560-021.000.
Szabados, Rudolph J.: *See*—
Berg, Lloyd; Wendt, Kraig M., and Szabados, Rudolph J., 4,877,490, Cl. 203-15.000.
Szechenyi, Kalman, to Alcatel N.V. Fast frame and phase synchronization apparatus. 4,878,229, Cl. 375-14.000.
Szyms, Walter; and Valaitis, Joseph W., to Armstrong Rubber Company, The. Reinforced tire curing bladder and method for using same. 4,877,469, Cl. 156-123.000.
Ta Triumph-Adler Aktiengesellschaft: *See*—
Haftmann, Johannes; and Schmeykal, Rudolf, 4,877,347, Cl. 400-479.000.
Tada, Tetsuya; Nagasaka, Masumi; Teratani, Tatsuo; Miyazaki, Akira; and Takahashi, Junji, to Toyota Jidosha Kabushiki Kaisha; and Fujitsu Ten Limited. Constant-speed control device for a vehicle. 4,877,101, Cl. 180-177.000.
Tagaki, Osamu: *See*—
Hayakawa, Kiyoharu; Matsumoto, Yumio; Ueda, Masashi; Sago, Akira; and Tagaki, Osamu, 4,878,084, Cl. 355-27.000.
Taguchi, Haruyoshi: *See*—
Maeda, Shigeyoshi; Asai, Tsunetoshi; Asano, Hidejiro; and Taguchi, Haruyoshi, 4,877,664, Cl. 428-35.900.
Taguchi, Kazuo: *See*—
Fuyama, Moriski; Tamura, Katsumi; Taguchi, Kazuo; Onisawa, Kenichi; Sato, Akira; Hashimoto, Kenichi; Nakayama, Takahiro; and Abe, Yoshio, 4,877,994, Cl. 313-503.000.
Taguchi, Nobuyoshi: *See*—
Sasaki, Isao; Kushi, Kenji; and Taguchi, Nobuyoshi, 4,877,922, Cl. 528-272.000.
Taguchi, Tomishige: *See*—
Sakata, Tsuguhide; Taguchi, Tomishige; Kimura, Norio; Tsuruno, Kunio; and Suzuki, Yasutomo, 4,878,131, Cl. 360-37.100.
Tahara, Yoshinori, to Meisan Co., Ltd. Slitter holder having clamping mechanism for slitter blade support rod. 4,876,933, Cl. 83-482.000.
Tai Yu Enterprise Co., Ltd.: *See*—
Lin, Chia-Hui, 4,877,045, Cl. 135-20.00M.
Taig, Alistair G., to Allied-Signal Inc. One-way clutch preventing back drive of reversible motor. 4,877,113, Cl. 188-82.840.
Taiho Kogyo Co., Ltd.: *See*—
Jinno, Osamu; and Fukuoka, Tatsuhiko, 4,877,813, Cl. 525-146.000.
Taillie, Joseph P.: *See*—
Seachman, Ned J.; Taillie, Joseph P.; and Dir, Gary A., 4,877,310, Cl. 350-347.00E.
Takada, Ikuko, to Kabushiki Kaisha Toshiba. Data transmission method and data transmission system free from local traffic jam. 4,878,218, Cl. 370-94.000.
Takada, Masaki: *See*—
Takahashi, Mamoru; Imamura, Shigeyuki; and Takada, Masaki, 4,877,733, Cl. 435-190.000.
Takada, Tomoaki: *See*—
Tatebayashi, June; Takada, Tomoaki; Hayashi, Kimitaka; and Kumagai, Chikanori, 4,877,397, Cl. 432-106.000.
Takagi, Shigeyuki, to Teijin Seiki Co., Ltd. Servo system. 4,878,005, Cl. 318-621.000.
Takagi, Takeo: *See*—
Nakagawa, Koji; Takagi, Takeo; Abe, Yoshiaki; and Sakai, Haruki, 4,877,370, Cl. 415-148.000.
Takagiwa, Hiroyuki; Takahashi, Jiro; Shirose, Meizo; Akimoto, Kunio; and Uchida, Masafumi, to Konishiroku Photo Industry Co., Ltd. Process for developing latent electrostatic image using toner containing polyester resin. 4,877,704, Cl. 430-99.000.
Takahashi, Jiro: *See*—
Takagiwa, Hiroyuki; Takahashi, Jiro; Shirose, Meizo; Akimoto, Kunio; and Uchida, Masafumi, 4,877,704, Cl. 430-99.000.

Takahashi, Junji: *See*—
Tada, Tetsuya; Nagasaka, Masumi; Teratani, Tatsuo; Miyazaki, Akira; and Takahashi, Junji, 4,877,101, Cl. 180-177.000.

Takahashi, Koji: *See*—
Masui, Toshiyuki; Kashida, Motokazu; Takahashi, Koji; and Nagasawa, Kenichi, 4,878,134, Cl. 360-77.150.
Yasumura, Hiroto; Hirasawa, Masahide; Noji, Minoru; Kozuki, Susumu; Takahashi, Koji; Yoshimura, Katsuji; and Sasatani, Tomohiko, 4,878,128, Cl. 358-315.000.

Takahashi, Kunihiko, to Nec Corporation. Microwave relay station having a common standby channel for signals of different types of modulation. 4,878,228, Cl. 375-3.000.

Takahashi, Mamoru; Imamura, Shigeyuki; and Takada, Masaki, to Toyo Jozo Kabushiki Kaisha. Glucose dehydrogenase and its production. 4,877,733, Cl. 435-190.000.

Takahashi, Masatomo: *See*—
Miura, Shigeo; Takahashi, Masatomo; Yoshino, Motoaki; Watanabe, Tsunehiro; Toyama, Takeshi; and Takahashi, Taketo, 4,878,123, Cl. 358-401.000.

Takahashi, Shigeru: *See*—
Fukuda, Takuya; Mochizuki, Yasuhiro; Momma, Naohiro; Takahashi, Shigeru; Suzuki, Noboru; Sonobe, Tadasi; Chiba, Kiyosi; and Suzuki, Kazuo, 4,876,983, Cl. 118-722.000.

Takahashi, Takeo: *See*—
Morioka, Takayuki; Motoyama, Nobuyuki; Hoshikawa, Hiroshi; Takahashi, Takeo; Suzuki, Sizuo; Ishikawa, Tuyoshi; Toyoshi, Takanori; and Uede, Toshio, 4,877,558, Cl. 252-626.000.

Takahashi, Takeshi: *See*—
Kodama, Akinori; and Takahashi, Takeshi, 4,877,149, Cl. 220-267.000.

Takahashi, Taketo: *See*—
Miura, Shigeo; Takahashi, Masatomo; Yoshino, Motoaki; Watanabe, Tsunehiro; Toyama, Takeshi; and Takahashi, Taketo, 4,878,123, Cl. 358-401.000.
Ohsaki, Saburou; Takahashi, Taketo; and Miki, Toshihiro, 4,877,962, Cl. 250-442.100.

Takahashi, Yuzuru: *See*—
Kakehi, Nobuo; Takahashi, Yuzuru; Higuchi, Norio; Izumihara, Yoshikazu; Matsumoto, Hiromi; and Uehori, Yuji, 4,876,874, Cl. 72-199.000.

Takakura, Masaki; Hayasaki, Hideto; Takemura, Hideo; Izumi, Masao; Iwasaki, Keisuke; Noguchi, Yoji; Yamane, Yasukuni; and Kako, Noritoshi, to Sharp Kabushiki Kaisha. Image processing device. 4,878,178, Cl. 364-521.000.

Takamatsu, Toshiaki, to Sharp Kabushiki Kaisha. Color liquid crystal display unit. 4,877,309, Cl. 350-337.000.

Takami, Hiroaki: *See*—
Yarita, Takao; Komori, Hideo; Ogasawara, Koji; and Takami, Hiroaki, 4,877,061, Cl. 139-224.00R.

Takamura, Yoshiyuki, to Fuji Pack System Ltd. Bag covering apparatus. 4,876,840, Cl. 53-137.000.

Takano, Hirotaka: *See*—
Mori, Tatsuya; Ohsumi, Tadashi; Nakamura, Shigeo; Maeda, Kiyoto; Nishida, Sumio; and Takano, Hirotaka, 4,877,441, Cl. 71-90.000.

Takano, Kazuya: *See*—
Noguchi, Takeshi; Takano, Kazuya; and Kikuchi, Takashi, 4,877,225, Cl. 267-140.100.

Takase, Muneaki: *See*—
Cai, Jun-Chao; and Takase, Muneaki, 4,877,803, Cl. 514-227.800.

Takasugi, Hisashi: *See*—
Takaya, Takao; Masugi, Takashi; Takasugi, Hisashi; and Kochi, Hiromu, 4,877,873, Cl. 544-227.000.

Takaya, Takao; Masugi, Takashi; Takasugi, Hisashi; and Kochi, Hiromu, to Fujisawa Pharmaceutical Co., Ltd. Syn-isomer of 3,7-disubstituted-3-cephem-4-carboxylic acid compounds and processes for the preparation thereof. 4,877,873, Cl. 544-227.000.

Takeda Chemical Industries, Ltd.: *See*—
Iga, Katsumi; Hamaguchi, Naoru; and Ogawa, Yasuaki, 4,877,561, Cl. 264-4.300.
Nogami, Ikuo; Yamaguchi, Takamasa; Oka, Masahide; and Shirafuji, Hideo, 4,877,735, Cl. 435-138.000.

Takehana, Takamichi; Murayama, Osamu; Nakajima, Hideaki; Yamada, Masatoshi; and Hamada, Makoto, to Chinon Kabushiki Kaisha. Camera zoom lens automatic magnification apparatus. 4,878,080, Cl. 354-403.000.

Takematsu, Takaharu: *See*—
Yamashita, Tohru; and Takematsu, Takaharu, 4,878,137, Cl. 360-98.050.

Takemura, Hideo: *See*—
Takakura, Masaki; Hayasaki, Hideto; Takemura, Hideo; Izumi, Masao; Iwasaki, Keisuke; Noguchi, Yoji; Yamane, Yasukuni; and Kako, Noritoshi, 4,878,178, Cl. 364-521.000.

Takeuchi, Akira: *See*—
Teranishi, Mitsuji; Watanabe, Yasuo; and Takeuchi, Akira, 4,878,176, Cl. 364-468.000.

Takeuchi, Yoshihiko: *See*—
Yatsuda, Hiromi; Takeuchi, Yoshihiko; Kohda, Toichi; and Yoshikawa, Shokichiro, 4,878,036, Cl. 333-195.000.

Takigawa: Masuhiko: *See*—
Ikebe, Takashi; and Takigawa: Masuhiko, 4,877,018, Cl. 128-81.00R.

Takimoto, Hiroyuki, to Canon Kabushiki Kaisha. Information signal reproducing apparatus in which a plurality of heads are selectively used. 4,878,133, Cl. 360-64.000.

Takino, Tetsuji: *See*—
Yamato, Osamu; and Takino, Tetsuji, 4,877,493, Cl. 204-15.000.

Talley Automotive Products, Inc.: *See*—
Cuevas, Jess, 4,877,264, Cl. 280-731.000.

Tamaru, Akio; and Izumisawa, Yoshiaki, to Mitsubishi Chemical Industries Limited. Process for preparing terephthalic acid of high quality. 4,877,900, Cl. 562-413.000.

Tamaru, Sinji; Kubo, Motonobu; and Kashiwagi, Masato, to Daikin Industries, Ltd. Fluorine-containing novolak resin and derivative thereof. 4,877,859, Cl. 528-129.000.

Tamura, Akihiko: *See*—
Yazaki, Jinichi; and Tamura, Akihiko, 4,877,662, Cl. 428-36.700.

Tamura, Katsumi: *See*—
Fuyama, Moriaki; Tamura, Katsumi; Taguchi, Kazuo; Onisawa, Kenichi; Sato, Akira; Hashimoto, Kenichi; Nakayama, Takahiro; and Abe, Yoshio, 4,877,994, Cl. 313-503.000.

Tamura, Satoshi: *See*—
Hasegawa, Masamitsu; Tamura, Satoshi; Wakashima, Takashi; and Sugiyama, Isao, 4,877,678, Cl. 428-216.000.

Tamura, Shigeki, to Fostex Corporation of Japan. Variable resistor. 4,878,040, Cl. 338-158.000.

Tamura, Yasuji, to Sanden Corporation. Slip detecting device for apparatus driven by a prime mover. 4,877,118, Cl. 192-103.00R.

Tanahashi, Haruhiko; Tsukamoto, Yoshikazu; and Miyakawa, Shinji, to Tokai Rubber Industries, Ltd.; and Toyota Jidosha Kabushiki Kaisha. Cylindrical upper support for shock absorber. 4,877,262, Cl. 280-668.000.

Tanaka, Hiroshi; Murata, Yasukiyo; and Eto, Kazumi, to Kabushiki Kaisha Toshiba. Defrost-water vaporizer of a refrigerator. 4,876,861, Cl. 62-279.000.

Tanaka, Hisami: *See*—
Hiro, Masaaki; Kimura, Tomohiro; Tanaka, Hisami; Kashimura, Noboru; Tanaka, Shigemori; Tohma, Hitoshi; and Hisamura, Masafumi, 4,877,701, Cl. 430-59.000.

Tanaka, Kanou: *See*—
Kotera, Masahide; Konishi, Motofumi; Ando, Yoshio; Iwaya, Toshio; Tanaka, Kanou; Hashimoto, Norio; Sugita, Yasutoshi; Sano, Yoshitaka; and Ono, Satoshi, 4,878,250, Cl. 382-56.000.

Tanaka, Norio: *See*—
Hagihara, Hisao; Banno, Takayuki; Miya, Shigenori; and Tanaka, Norio, 4,876,778, Cl. 29-157.30A.

Tanaka, Shigemori: *See*—
Hiro, Masaaki; Kimura, Tomohiro; Tanaka, Hisami; Kashimura, Noboru; Tanaka, Shigemori; Tohma, Hitoshi; and Hisamura, Masafumi, 4,877,701, Cl. 430-59.000.

Tanaka, Susumu; Sato, Masaaki; Kaeriyama, Kyoji; Suda, Yoshio; and Hiraide, Takao, to Agency of Industrial Science and Technology; and Ministry of International Trade and Industry. Thiophene derivative polymer and a polymer composition thereof. 4,877,852, Cl. 526-256.000.

Tanaka, Tomiji: *See*—
Aratani, Katsuhisa; Nakaoki, Ariyoshi; and Tanaka, Tomiji, 4,878,132, Cl. 360-59.000.

Tanaka, Tsuneo: *See*—
Hanada, Koji; Sawamura, Masashi; Yoshikawa, Takeshi; Nihashi, Hiroyuki; and Tanaka, Tsuneo, 4,877,681, Cl. 428-336.000.

Tanaka, Yoshio; and Saitou, Shirou, to Kureha Chemical Industry Co., Ltd. Ultraviolet sterilizing apparatus. 4,877,964, Cl. 250-455.100.

Tanaka, Yutaka: *See*—
Yagoto, Mitsutoshi; Hamada, Akiyoshi; Mino, Masayuki; Tanaka, Yutaka; and Watanabe, Yutaka, 4,878,067, Cl. 346-108.000.

Taneya, Mototaka: *See*—
Morimoto, Taiji; Hosoba, Hiroyuki; Matsumoto, Mitsuhiro; Taneya, Mototaka; and Matsui, Sadayoshi, 4,878,223, Cl. 372-50.000.

Tange, Keigo: *See*—
Matsushita, Kouji; Tange, Keigo; and Yuge, Shizuo, 4,878,082, Cl. 355-208.000.

Tani, Hiroji; Kasanami, Tohru; and Yokoi, Tsutomu, to Murata Manufacturing Co., Ltd. Method of manufacturing circuit component such as stator for variable resistor. 4,877,565, Cl. 264-105.000.

Tani, Hiroji: *See*—
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Tsuji, Masayoshi; Nakagawa, Akira; Inoue, Hisataka; Hachiya, Terumi; Tanoue, Yoshihiro; Ikesue, Kouichi; Saita, Masaru; Mizoguchi, Takenobu; Aoki, Testsuo; Sato, Hironobu; and Nodo, Kanji, 4,877,876, Cl. 544-133.000.

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Gill, Hardayal S.; Hesterman, Victor W.; Tarnopolsky, Giora J.; and Tran, Lung T., 4,878,140, Cl. 360-113.000.

Tarpai, Gyula: *See—*
Neu Jozsef; Csatlos, Imre; Varga, Andras; Suranyi, Robert; Ilovai, Zoltan; Gaal, Sandor; Karsai, Jozsef; Sebestyen, Endre; Gardi, Eva; Siki, Karoly; Toth, Istvan; Gal, Guszt/e,acu/a/ v; Dombay, Zsolt; Grega nee Toth, Mrs. Erzsebet; Pavliscsak, Csaba; Tarpai, Gyula; Bonnyay, Peter; and Santha, Pal, 4,877,893, Cl. 558-86.000.

Tassen, Curtis S.: *See—*
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Tatsuta, Kuniaki: *See—*
Umezawa, Hamao, deceased; Tatsuta, Kuniaki; Kawai, Hiroyuki; and Nakajima, Shohachi, 4,877,870, Cl. 536-6.400.

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Tayco Developments, Inc.: *See—*
Taylor, Paul H., 4,877,114, Cl. 188-285.000.
Taylor, Paul H., 4,877,226, Cl. 267-196.000.

Taylor, Bruce G.: *See—*
Petrucci, Raymond M.; Taylor, Bruce G.; Giordano, Edward C.; Padiali, James M.; and Palmer, Carl, 4,877,521, Cl. 210-171.000.

Taylor, Jim. Automatic ball pitcher. 4,877,243, Cl. 273-26.00R.

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Taylor, Stephen C., to Imperial Chemical Industries plc. Production of cells. 4,877,740, Cl. 435-253.300.

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Taylor, William P. Reclining chair. 4,877,291, Cl. 297-321.000.

TD Quilting Machinery: *See—*
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Tecron Industries Limited: *See—*
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Teh Yor Industrial Co., Ltd.: *See—*
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Helm, Charles W.; and Koval, Vernon E., 4,877,092, Cl. 175-74.000.

Telefind Corp.: *See—*
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Fein, Michael E., 4,877,997, Cl. 313-634.000.

Teng, Chia-Chi; and Stuetz, Dagobert E., to Hoechst Celanese Corporation. Thin film waveguide electrooptic modulator. 4,877,298, Cl. 350-96.140.

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Ter Burg, Antonius W. M.: *See—*
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Liu, Christopher S.; Clarke, Donald J.; and Grina, Larry D., 4,877,834, Cl. 525-66.000.
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Freeman, Dean W., 4,877,753, Cl. 437-101.000.
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Strott, Douglas B.; and Kawate, Keith W., 4,876,899, Cl. 73-862.330.
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Thatcher, Alan J. Spin trimming machine with object positioning. 4,876,930, Cl. 82-46.000.

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Thinking Machines Corporation: *See—*
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Thompson, Stanley C. Golf club head and method of strengthening same. 4,877,249, Cl. 273-169.000.

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Tillotson Ltd.: *See*—
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Hoeprich, Michael R., 4,877,340, Cl. 384-571.000.
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Tobita, Michiaki: *See*—
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Toei, Junichi; and Baba, Nobuyuki, to Tosho Corporation. Liquid supply apparatus. 4,877,522, Cl. 210-198.200.
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Wunning, Joachim, to WS Warmeprozesstechnik GmbH. Industrial burner with cylindrical ceramic recuperative air preheater. 4,877,396, Cl. 431-158.000.
Wunsche, Peter, to 501 AVL Gesellschaft fur Verbrennungskraftmaschinen und Messtechnik MbH. Crankcase for internal combustion engines. 4,876,998, Cl. 123-198.00E.
Wylie, David G.: *See*—
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Beikirch, Thomas R.; Traino, James C.; and Williams, Leon C., 4,878,119, Cl. 358-471.000.
Chow, Che C., 4,876,777, Cl. 29-132.000.
Edmunds, Cyril G., 4,878,093, Cl. 355-296.000.
Grushkin, Bernard; Chang, Hui; and Ruhland, John G., 4,877,707, Cl. 430-106.600.
Kazan, Benjamin; and Hagstrom, Stig B. M., 4,878,213, Cl. 369-126.000.
Mahabadi, Hadi K.; Ng, Tie H.; Listigovers, Nancy A.; and Martin, Trevor I., 4,877,706, Cl. 430-106.600.
Mandel, Barry P., 4,877,234, Cl. 271-225.000.
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Winnik, Francoise M.; and Keoshkerian, Barkev, 4,877,451, Cl. 106-23.000.
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Yabe, Toshinori; and Ozaki, Kazuo, to Bridgestone Corporation. Strip supplying device. 4,877,477, Cl. 156-406.400.
Yabuno, Ryohei: *See*—
Kato, Yukihiro; Ishii, Masami; Yabuno, Ryohei; and Oka, Tetsuo, 4,876,893, Cl. 73-726.000.

Yagasaki, Toshiaki: *See*—
Shimizu, Katsuichi; Masuda, Shunichi; Yagasaki, Toshiaki; and Sakamaki, Hisashi, 4,878,130, Cl. 358-400.000.

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Yagoto, Mitsutoshi; Hamada, Akiyoshi; Mino, Masayuki; Tanaka, Yutaka; and Watanabe, Yutaka, to Minolta Camera Kabushiki Kaisha. Laser recorder with stable film feed auxiliary scanning. 4,878,067, Cl. 346-108.000.

Yakima Products, Inc.: *See*—
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Yale Security Inc.: *See*—
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Yamada, Masahiro: *See*—
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Yamada, Masatoshi: *See*—
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Yamada, Sumito: *See*—
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Yamada, Takeshi, to Shinpo Kabushiki Kaisha. Multipurpose smokeless roaster. 4,877,015, Cl. 126-299.00R.

Yamagata, Tetsuo, to Honda Giken Kogyo K.K.; and Kabushiki Kaisha Honda Rokku. Locking cable for antitheft devices. 4,878,045, Cl. 340-556.000.

Yamagishi, Koji: *See*—
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Yamaha Corporation: *See*—
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Yamamiya, Kazuo: *See*—
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Yamamoto, Isamu; and Fukushima, Jiro, to Mitsubishi Denki Kabushiki Kaisha. Method of packaging a semiconductor laser and photosensitive semiconductor device. 4,877,756, Cl. 437-209.000.

Yamamoto, Naoki: *See*—
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Yamamoto, Yasuhiro; Miwa, Teiji; and Ajima, Tadashi, to Honda Giken Kogyo Kabushiki Kaisha. Method and apparatus for assembling an instrument panel in an automobile. 4,876,786, Cl. 29-429.000.

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Yamamuro, Mikio, to Kabushiki Kaisha Toshiba. Current-voltage converter circuit. 4,877,953, Cl. 250-214.00R.

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Yamase, Tokuhiro, to Asmo Co., Ltd. Actuator of an air conditioner of a vehicle. 4,877,926, Cl. 200-19.00R.

Yamashita, Tohru; and Takematsu, Takaharu, to Mitsubishi Denki Kabushiki Kaisha. Disk file device. 4,878,137, Cl. 360-98.050.

Yamashita, Yoshikazu; and Ikenaga, Toshiharu, to Okamura Corporation. Vertical excursion accommodation apparatus. 4,877,121, Cl. 198-475.100.

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Yamato, Osamu; and Takino, Tetsuji, to Oki Electric Industry Co., Ltd. Dielectric block plating process. 4,877,493, Cl. 204-15.000.

Yamauchi, Yoshihiko, to Ikeda Bussan Co., Ltd. Foldable seat assembly for motor vehicle. 4,877,282, Cl. 296-65.100.

Yamazaki, Osamu: *See*—
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Yamazaki, Shunpei, to Eastman Kodak Company. Semiconductor photoelectric conversion device and method for making same. 4,878,097, Cl. 357-58.000.

Yamazaki, Shunpei: *See*—
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Yanagawa, Moriyuki; Ishida, Shunichi; Ogura, Ken; and Saito, Yushi, to Nippon Hyomen Kagaku Kabushiki Kaisha. Zinc-nickel alloy plating solution. 4,877,496, Cl. 204-44.200.

Yang, Jesse S. Bridge expansion joint. 4,876,759, Cl. 14-16.500.

Yang, Yu-Chung: *See*—
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Yang, Zhen H. Antiammonia azotobacter and the use thereof. 4,877,739, Cl. 435-252.100.

Yangas, Roger A. Method and apparatus for controlling distribution and power within the cells of a device for promoting the uniform heating of a food product in a radiant energy field. 4,877,933, Cl. 219-10.55M.

Yano, Kazuo, to Thyme Tech Co., Ltd. Pipe fitting. 4,877,219, Cl. 251-149.200.

Yarita, Takao; Komori, Hideo; Ogasawara, Koji; and Takami, Hiroaki, to Ichikawa Woolen Textile Co., Ltd. Automatic cop exchanging apparatus for shuttle loom. 4,877,061, Cl. 139-224.00R.

Yaso, Masao; Suzuki, Yukio; Shibata, Kensuke; and Hayashi, Eiichi, to Toyo Jozo Kabushiki Kaisha. 1-Substituted alkyl-2-oxo-hexahydroquinoxaline derivatives. 4,877,875, Cl. 544-116.000.

Yaso, Masao; Suzuki, Yukio; Shibata, Kensuke; and Hayashi, Eiichi, to Toyo Jozo Kabushiki Kaisha. 1-substituted alkyl-2-oxo-hexahydroquinoxaline derivatives. 4,877,877, Cl. 544-354.000.

Yasuda, Shigeru; Yasukawa, Kenichiro; Nakamura, Tsutomu; and Asami, Kenitiro, to Pioneer Electronic Corporation. Method for reproduction of stored video signals with disk reproducing apparatus. 4,878,129, Cl. 358-342.000.

Yasui, Yasuyoshi; and Azuma, Hitoshi, to Toyota Jidosha Kabushiki Kaisha. Differential gear unit with limited slip mechanism. 4,876,921, Cl. 74-710.500.

Yasukawa, Kenichiro: *See*—
Yasuda, Shigeru; Yasukawa, Kenichiro; Nakamura, Tsutomu; and Asami, Kenitiro, 4,878,129, Cl. 358-342.000.

Yasukawa, Takeshi; Onishi, Masayoshi; and Fujimoto, Tadayuki, to Mitsubishi Denki Kabushiki Kaisha. Constant speed holding device for vehicle. 4,876,948, Cl. 92-99.000.

Yasumura, Hiroto; Hirasawa, Masahide; Noji, Minoru; Kozuki, Susumu; Takahashi, Koji; Yoshimura, Katsuji; and Sasatani, Tomohiko, to Canon Kabushiki Kaisha. Video signal reproducing apparatus. 4,878,128, Cl. 358-315.000.

Yates, John T., Jr.; Griffin, Gregory L.; and Kiskinova, Maya. Temperature programmed spectroscopy techniques. 4,877,584, Cl. 422-88.000.

Yatsuda, Hiromi; Takeuchi, Yoshihiko; Kohda, Toichi; and Yoshikawa, Shokichiro, to Nihon Musen Kabushiki Kaisha. Surface elastic wave filter. 4,878,036, Cl. 333-195.000.

Yau, Wallace W., to Du Pont de Nemours, E. I., and Company. Viscosity detection method for liquid chromatography systems with carrier liquids having time-varying viscosity. 4,876,882, Cl. 73-55.000.

Yaver, Perry N., to D.L. Auld Company, The. Decorative trim strip with enhanced depth of vision. 4,877,657, Cl. 428-31.000.

Yazaki, Jinichi; and Tamura, Akihiko, to Toyo Seikan Kaisha, LTD. Vessel comprising resin composition. 4,877,662, Cl. 428-36.700.

Yazawa, Kenichiro; Seshimoto, Osamu; Kitajima, Masao; and Kondo, Asaji, to Fuji Photo Film Co., Ltd. Multilayer device for detecting bilurubin. 4,877,579, Cl. 422-56.000.

Yeh, Pochi A., to Rockwell International Corporation. Reconfigurable Optical interconnect using dynamic hologram. 4,877,297, Cl. 350-3.680.

Yeh, Walter C. Y. Electronic tone generator for generating a main melody, a first accompaniment, and a second accompaniment. 4,876,936, Cl. 84-612.000.

Yogev, Amnon; and Mahlab, David, to Ormat Turbines (1965) Ltd. Working fluid for rankine cycle power plant. 4,876,855, Cl. 60-651.000.

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Tani, Hiroji; Kasanami, Tohru; and Yokoi, Tsutomu, 4,877,565, Cl. 264-105.000.

Yokomori, Kiyoshi; and Isobe, Tami, to Ricoh Company, Ltd. Covered optical waveguide having an inlet opening. 4,877,301, Cl. 350-96.190.

York, Rudy L.; Luttmer, Joseph D.; Smith, Patricia B.; and Davis, Cecil J., to Texas Instruments Incorporated. Method of sequential cleaning and passivating a GaAs substrate using remote oxygen plasma. 4,877,757, Cl. 437-235.000.

Yoshida Kogyo K. K.: *See*—
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Katayama, Akihiro; Ohsawa, Hidefumi; Sunohara, Izuru; Hosokawa, Hiroshi; and Yoshimoto, Masahiko, 4,878,125, Cl. 358-443.000.

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Yoshizumi, Yasuji; and Matsuoka, Yoshiyuki, to Mitsubishi Denki Kabushiki Kaisha. Method for manufacturing an electrically insulating formed channel member. 4,877,567, Cl. 264-153.000.

Yosihara, Kunio: *See*—
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Young, Brian D.: *See*—
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Young, Donald C., to Union Oil Company of California. Acid catalyzed nitration. 4,877,869, Cl. 536-35.000.

Young, Ralph H.; and May, John W., to Eastman Kodak Company. Electrophotographic luminescent amplification process. 4,877,699, Cl. 430-54.000.

Yuge, Shizuo: *See*—
Matsushita, Kouji; Tange, Keigo; and Yuge, Shizuo, 4,878,082, Cl. 355-208.000.

Yuhaku, Satoru; Nakatani, Seiichi; and Nishimura, Tutomu, to Matsushita Electric Industrial Co., Ltd. Conductor composition and method of manufacturing a ceramic multilayer structure using the same. 4,877,555, Cl. 252-512.000.

Yukl, Tex, to Spatial Communications, Inc. Farfield/nearfield transmission/reception antenna. 4,878,059, Cl. 343-753.000.

Yunoki, Hideo, to Fujitsu Limited. Method for management of logical channels for ISDN packet service. 4,878,216, Cl. 370-60.000.

Yuscavage, John J. Board game. 4,877,254, Cl. 273-249.000.

Yusko, Edward M., Jr.; Brown, Cal R.; Kalain, Terry M.; and Williams, Peter C., to Whitey Co. Pinch valve. 4,877,053, Cl. 137-556.000.

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Zalkin, Daniel, to B.O.C.S.A. Apparatus for artificial ventilation for assisting the volumetric breathing of a patient. 4,877,023, Cl. 128-204.210.

Zampino, Michael J.; Wilson, Richard A.; Mookherjee, Braja D.; and Niel, Jean C., to International Flavors & Fragrances Inc. 6,7-(epithio)-3,7-dimethyl-1,3-octadiene and use thereof in augmenting or enhancing aroma of perfume compositions, colognes and perfurmed articles. 4,877,769, Cl. 512-11.000.

Zapata, Alvaro. Reduced vibration portable gas operated hand saw. 4,876,797, Cl. 30-388.000.

Zayas Luna, Victor M.: *See*—
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Zed Instruments Ltd.: *See*—
Zollman, Peter M.; Pollard, Brendon T.; and Birch, Andrew D., 4,878,127, Cl. 358-299.000.

Zeevi, Eliahu I. Vehicle navigation system. 4,878,170, Cl. 364-449.000.

Zehnder, Wolfgang: *See*—
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Zeller Plastik Koehn, Graebner & Co.: *See*—
Thanisch, Klaus, 4,877,144, Cl. 215-330.000.

Zenbayashi, Michio: *See*—
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Zenyaku Kogyo Kabushiki Kaisha: *See*—
Cai, Jun-Chao; and Takase, Muneaki, 4,877,803, Cl. 514-227.800.

Zerbs, Stephen T.: *See*—
Bleich, Larry L.; Roberts, Joni A.; and Zerbs, Stephen T., 4,877,645, Cl. 427-117.000.

Zetlmeisl, Michael J.; and Fahey, William F., to Petrolite Corporation. Corrosion inhibitors. 4,877,578, Cl. 422-14.000.

Ziegler, Eldon, Jr., to Noise Cancellation Tech. Selective active cancellation system for repetitive phenomena. 4,878,188, Cl. 364-724.010.

Ziegler, Walter: *See*—
Koch, Horst; and Ziegler, Walter, 4,877,715, Cl. 430-271.000.

Zimmerman, Harold. Level with illuminated bubble vials. 4,876,798, Cl. 33-348.200.

Zimmerman, Karen M. Garment hanger accessory. 4,877,163, Cl. 223-93.000.

Zimmerman, Richard H.: *See*—
Wu, Jeff C.; Williams, Richard T.; Rowlette, John R.; Brooks, Charles P.; and Zimmerman, Richard H., 4,877,644, Cl. 427-53.100.

Ziolo, Ronald F., to Xerox Corporation. Processes for the preparation of copper oxide superconductors. 4,877,768, Cl. 505-1.000.

Zirczy, Geza N.: *See*—
Lon, Jesus R.; Rivas, Olegario; and Zirczy, Geza N., 4,877,542, Cl. 252-62.000.

Zollman, Peter M.; Pollard, Brendon T.; and Birch, Andrew D., to Zed Instruments Ltd. Laser engraving machine for preparing rotary screen printing screens. 4,878,127, Cl. 358-299.000.

Zook, Lee M.: *See*—
Novak, Howard L.; and Zook, Lee M., 4,877,638, Cl. 427-8.000.

Zorini, Luigi O., to Comez S.P.A. Control device for threading tubes in crochet galloon looms. 4,876,862, Cl. 66-207.000.

Zorloni, Riccardo. Ionic air cleaner for homes and motor vehicles. 4,877,428, Cl. 55-139.000.

Zorn, Helmut; and Schaeffler, Georg, to INA Walzlager Schaeffler KG. Self-adjusting hydraulic valve tappet. 4,876,997, Cl. 123-90.520.

Zudilina, Ljudmila J.: *See*—
Matros, Jury S.; Chumachenko, Viktor A.; Zudilina, Ljudmila J.; Noskov, Alexandr S.; and Bugdan, Evgeny S., 4,877,592, Cl. 423-245.100.

Zulauf, Karlheinz: *See*—
Lamboy, Peter; Steigerwald, Franz; Zulauf, Karlheinz; and Ginnow-Markert, Harmut, 4,877,065, Cl. 141-18.000.

Zumsteg, Deborah M.: *See*—
Cantwell, Robert R.; Hallemann, Raymond F.; and Zumsteg, Deborah M., 4,877,044, Cl. 135-104.000.

Zunkel, Gary D., to Halliburton Company. Pressure limiter for a downhole pump and testing apparatus. 4,877,086, Cl. 166-106.000.

501 AVL Gesellschaft fur Verbrennungskraftmaschinen und Messtechnik MbH: *See*—
Wunsche, Peter, 4,876,998, Cl. 123-198.00E.

LIST OF REISSUE PATENTEES

TO WHOM

PATENTS WERE ISSUED ON THE 31ST DAY OF OCTOBER, 1989

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

Chao, Chien C.: *See*—
Sherman, John D.; and Chao, Chien C., Re. 33,105, Cl. 536-127.000.

Kioritz & Corporation: *See*—
Nagashima, Akira, Re. 33,103, Cl. 210-172.000.

Malot, James J.: *See*—
Visser, Melvin J.; and Malot, James J., Re. 33,102, Cl. 166-267.000.

Nagashima, Akira, to Kioritz & Corporation. Strainer. Re. 33,103, Cl. 210-172.000.

Sherman, John D.; and Chao, Chien C., to UOP. Separation of mannose by selective adsorption on zeolitic molecular sieves. Re. 33,105, Cl. 536-127.000.

Taylor, Peter C. Rock climbing adjustable chock. Re. 33,104, Cl. 248-231.200.

UOP: *See*—
Sherman, John D.; and Chao, Chien C., Re. 33,105, Cl. 536-127.000.

Upjohn Company, The: *See*—
Visser, Melvin J.; and Malot, James J., Re. 33,102, Cl. 166-267.000.

Visser, Melvin J.; and Malot, James J., to Upjohn Company, The. Removal of volatile contaminants from the vadose zone of contaminated ground. Re. 33,102, Cl. 166-267.000.

LIST OF DESIGN PATENTEES

Aavid Engineering, Inc.: *See*—
McCarthy, Alfred F., 304,293, Cl. D8-349.000.

Aerospatiale Societe Nationale Industrielle: *See*—
Calis, Rene , 304,310, Cl. D10-106.000.

Aobori, Tetsuro: *See*—
Naito, Masahito; Higa, Toshiro; Aobori, Tetsuro; Kubota, Eiichi; and Obata, Takeichi, 304,281, Cl. D7-351.000.

Arbogast, J. R. Combined game board and game pieces. 304,350, 10-31-89, Cl. D21-14.000.

Arkay Corporation: *See*—
DeLeeuw, James A.; and Sims, Raymond E., 304,340, Cl. D15-199.000.

Armstrong, Timothy O.; Bull, John W.; and Smith, David B., to Precor Incorporated. Stair climbing exercise apparatus. 304,358, 10-31-89, Cl. D21-195.000.

Avery International: *See*—
Popat, Ghanshyam H.; Chen, Tien-Tsung; Binkley, Christopher H.; and Tsai, K. Fou, 304,343, Cl. D19-26.000.

Babcock, Lowell C. Comb attachment or the like for holding permanent wave paper. 304,383, 10-31-89, Cl. D28-34.000.

Bailly, Francois. Sliding headlight. 304,380, 10-31-89, Cl. D26-29.000.

Bannister, Roger, to Helix Fragrances Inc. Combined bottle and cap. 304,298, 10-31-89, Cl. D9-386.000.

Bartlett, Inger. Desk. 304,268, 10-31-89, Cl. D6-428.000.

Baus, Heinz G. Mirrored cabinet. 304,273, 10-31-89, Cl. D6-559.000.

Baus, Heinz G. Combined mirrored cabinet and lights. 304,274, 10-31-89, Cl. D6-561.000.

Benke, Wolfgang, to Westfalische Metall Industrie KG Huec & Co. Front face of a vehicle hub cap. 304,321, 10-31-89, Cl. D12-204.000.

Berry, Bernie B., Jr. Surgical bone rasp. 304,372, 10-31-89, Cl. D24-26.000.

Binkley, Christopher H.: *See*—
Popat, Ghanshyam H.; Chen, Tien-Tsung; Binkley, Christopher H.; and Tsai, K. Fou, 304,343, Cl. D19-26.000.

Biotteau, Gerard, to Societe T.B.S. Industrie (SARL). Electric teller terminal. 304,330, 10-31-89, Cl. D14-105.000.

Black & Decker Inc.: *See*—
Zurwelle, Donald W., 304,287, Cl. D8-68.000.

Bobrowski, Louis G., to Stanley Works, The. Surface mounted latch bolt. 304,292, 10-31-89, Cl. D8-341.000.

Bonko, Mark L., to Goodyear Tire & Rubber Company, The. Tire. 304,320, 10-31-89, Cl. D12-151.000.

Bounds, William E. Condiment mill. 304,278, 10-31-89, Cl. D7-53.000.

Bowbeer, Grant R. N. Orthodontic appliance. 304,370, 10-31-89, Cl. D24-10.000.

Boweter, Michael, to NUWAVE Products Ltd. Hairbrush. 304,265, 10-31-89, Cl. D4-136.000.

British Telecommunications: *See*—
Sermon, William J., 304,338, Cl. D14-240.000.

Broken Hill Proprietary Company Limited, The: *See*—
Dalli, Alan G.; and Revill, Peter L., 304,302, Cl. D9-438.000.

Brown, Ada M. Wall mounted planter. 304,272, 10-31-89, Cl. D6-557.000.

Brown Jordan Company: *See*—
Frinier, Richard, 304,266, Cl. D6-381.000.

Brummer, Tim. Recumbant bicycle. 304,319, 10-31-89, Cl. D12-111.000.

Bulgari, Paolo, to Partecipazioni Bulgari S.p.A. Necklace. 304,312, 10-31-89, Cl. D11-13.000.

Bulgari, Paolo, to Partecipazioni Bulgari S.p.A. Link element. 304,314, 10-31-89, Cl. D11-93.000.

Bulgari, Paolo, to Partecipazioni Bulgari S.p.A. Link element. 304,315, 10-31-89, Cl. D11-93.000.

Bull, John W.: *See*—
Armstrong, Timothy O.; Bull, John W.; and Smith, David B., 304,358, Cl. D21-195.000.

Calis, Rene , to Aerospatiale Societe Nationale Industrielle. Emergency radio signal transmitter. 304,310, 10-31-89, Cl. D10-106.000.

Campbell, Andrew E. Strapped miniature flashlight. 304,381, 10-31-89, Cl. D26-37.000.

Casio Computer Co., Ltd.: *See*—
Morishima, Takashi, 304,305, Cl. D10-38.000.

Cat Eye Co., Ltd.: *See*—
Kagayama, Joe, 304,306, Cl. D10-46.000.

Challberg, Sharon S.; and Kiser, Randall, to Life Technologies, Inc. Reaction tray for membrane hybridizations. 304,369, 10-31-89, Cl. D24-8.000.

Chappellet, Mary A. Base for multiple candle lamps. 304,379, 10-31-89, Cl. D26-9.000.

Charet, Pierre; and Kraai, Duke, to Rally Manufacturing, Inc. Flip up modular digital clock for automobile control panels. 304,304, 10-31-89, Cl. D10-15.000.

Chen, Jim. Telephone set. 304,335, 10-31-89, Cl. D14-142.000.

Chen, Tien-Tsung: *See*—
Popat, Ghanshyam H.; Chen, Tien-Tsung; Binkley, Christopher H.; and Tsai, K. Fou, 304,343, Cl. D19-26.000.

Cheung, George C. H., to Tak Ming Industrial Co. Record holder. 304,261, 10-31-89, Cl. D3-35.000.

Coca-Cola Company, The: *See*—
Credle, William S., Jr., 304,283, Cl. D7-397.000.

Colclasure, George M., to Laid Back Enterprises, Inc. Novelty ski seat. 304,361, 10-31-89, Cl. D21-230.000.

Colgate-Palmolive Company: *See*—
Segati, Umberto D. I., 304,297, Cl. D9-376.000.

Collins, John A., Jr. Orthodontic appliance. 304,371, 10-31-89, Cl. D24-10.000.

Collins, Thomas J.; Schneider, Pina; Nieves, Anthony L.; and Graham, Thomas G., to Keptel, Inc. Telephone network interface apparatus. 304,339, 10-31-89, Cl. D14-240.000.

Colquitt, J. Craig. Condiment shaker. 304,279, 10-31-89, Cl. D7-56.000.

Corrie, Alexander S. Fishing hand caster. 304,362, 10-31-89, Cl. D22-137.000.

Cranston, William V., III; Martin, Randall W.; and Young, Mark A., to International Business Machines Corp. Modular computer. 304,323, 10-31-89, Cl. D13-12.000.

Creative Athletic Products and Services, Inc.: *See*—
Wright, Robert L., 304,359, Cl. D21-199.000.

Credle, William S., Jr., to Coca-Cola Company, The. Syrup pump for beverage dispensing. 304,283, 10-31-89, Cl. D7-397.000.

Curry, Norman R. Coaster. 304,360, 10-31-89, Cl. D21-227.000.

Dalli, Alan G.; and Revill, Peter L., to Broken Hill Proprietary Company Limited, The. Can end. 304,302, 10-31-89, Cl. D9-438.000.

Dart Industries Inc.: *See*—
Wolff, Martin J.; and Zimmerman, Larry G., 304,276, Cl. D7-46.000.
Wolff, Martin J.; and Zimmerman, Larry G., 304,277, Cl. D7-46.000.
Wolff, Martin J.; and Zimmerman, Larry G., 304,284, Cl. D7-412.000.

David, Thomas J.: *See*—
Foran, Kenneth C.; and David, Thomas J., 304,345, Cl. D19-75.000.

DeLeeuw, James A.; and Sims, Raymond E., to Arkay Corporation. Machine for dehydrating photographic chemicals. 304,340, 10-31-89, Cl. D15-199.000.
Derobert, Guy G. A., to Intertechnique S.A. Combined respiratory mask and inflatable head straps. 304,384, 10-31-89, Cl. D29-9.000.
Domon, Yoshihiro: *See—*
Fujita, Toshiharu; Yamazaki, Hiroyoshi; Maeda, Noriyuki; Shimizu, Kazutaka; Tanaka, Norihiko; Domon, Yoshihiro; Iwasawa, Kiyoshi; Futatsugi, Mitsuyuki; Takizawa, Fuminobu; Suzuki, Masakatsu; and Kosaka, Makoto, 304,377, Cl. D26-3.000.
Dorning, Larry R. Dickey and hood combination. 304,257, 10-31-89, Cl. D2-181.000.
Duke, Richard T., to Procter & Gamble Company, The. Container blank. 304,300, 10-31-89, Cl. D9-433.000.
Dunn, Gary D. Weatherized display board for construction sites. 304,348, 10-31-89, Cl. D20-10.000.
Eastern Company, The: *See—*
Weinerman, Lee S.; and Vargus, Joel T., 304,291, Cl. D8-331.000.
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Feimer, Bryan A.; Roethel, Henry G.; and Kowalics, Raymond P., to Meyer Company, The. Container lid. 304,282, 10-31-89, Cl. D7-391.000.
Fender Musical Instruments Corporation: *See—*
Gressett, Charles A., Jr.; Todd, Charles H., III; and Page, John F., 304,341, Cl. D17-21.000.
Figgie International Inc.: *See—*
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Floyd, Rosalie. Female urinal. 304,373, 10-31-89, Cl. D24-54.000.
Foran, Kenneth C.; and David, Thomas J., to Rubbermaid Incorporated. Utility file. 304,345, 10-31-89, Cl. D19-75.000.
Foster, Elaine. Brooch. 304,313, 10-31-89, Cl. D11-48.000.
Frinier, Richard, to Brown Jordan Company. Sofa. 304,266, 10-31-89, Cl. D6-381.000.
Fujita, Toshiharu; Yamazaki, Hiroyoshi; Maeda, Noriyuki; Shimizu, Kazutaka; Tanaka, Norihiko; Domon, Yoshihiro; Iwasawa, Kiyoshi; Futatsugi, Mitsuyuki; Takizawa, Fuminobu; Suzuki, Masakatsu; and Kosaka, Makoto, to Mitsubishi Denki Kabushiki Kaisha. Fluorescent lamp. 304,377, 10-31-89, Cl. D26-3.000.
Fung, May, to ETNA Products Co. Inc. Telephone index unit. 304,346, 10-31-89, Cl. D19-76.000.
Futatsugi, Mitsuyuki: *See—*
Fujita, Toshiharu; Yamazaki, Hiroyoshi; Maeda, Noriyuki; Shimizu, Kazutaka; Tanaka, Norihiko; Domon, Yoshihiro; Iwasawa, Kiyoshi; Futatsugi, Mitsuyuki; Takizawa, Fuminobu; Suzuki, Masakatsu; and Kosaka, Makoto, 304,377, Cl. D26-3.000.
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Meyers, Kenneth A., 304,366, Cl. D23-356.000.
Gerity Products, Inc.: *See—*
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Goldman, Howard B. Adjustable keyboard support stand. 304,270, 10-31-89, Cl. D6-462.000.
Gonzalez, Raymond: *See—*
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Graham, Thomas G.: *See—*
Collins, Thomas J.; Schneider, Pina; Nieves, Anthony L.; and Graham, Thomas G., 304,339, Cl. D14-240.000.
Grenda, Dale. Combined container and integral flexible funnel. 304,294, 10-31-89, Cl. D9-337.000.
Gressett, Charles A., Jr.; Todd, Charles H., III; and Page, John F., to Fender Musical Instruments Corporation. Bridge assembly for guitars. 304,341, 10-31-89, Cl. D17-21.000.
Guss, Shiela, to Playtex Apparel, Inc. Brassiere. 304,255, 10-31-89, Cl. D2-24.000.
Hara, Kunio, to Kabushiki Kaisha Toshiba. Optical disk storage device. 304,332, 10-31-89, Cl. D14-109.000.
Harpe, Willie. Combined talking calendar and thermometer. 304,342, 10-31-89, Cl. D19-21.000.
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Hitachi Heating Appliances Co., Ltd.: *See—*
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Johnson, Van K. Audio video component dust cover. 304,271, 10-31-89, Cl. D6-470.000.
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Kerezman, Paul A.; Koteff, Walter B.; and Stricker, Alfred A., to International Business Machines Corporation. Diskette drive front panel. 304,333, 10-31-89, Cl. D14-114.000.
Kiefer, Val A. Bowl. 304,275, 10-31-89, Cl. D7-23.000.
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Maes, Sidney W. Bicycle exercise stand. 304,357, 10-31-89, Cl. D21-194.000.

Manzo, Louis. Rounded staircase baluster. 304,375, 10-31-89, Cl. D25-38.000.

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McEntee, Theresa D. Bunting bag. 304,256, 10-31-89, Cl. D2-25.000.

Meier, Willis A. Underwater dynamoelectric machine. 304,322, 10-31-89, Cl. D13-3.000.

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Moe, Dennis. Construction toy link. 304,353, 10-31-89, Cl. D21-108.000.

Mohrle, Raymond L., to Warner-Lambert Company. Multicolored toothpaste. 304,382, 10-31-89, Cl. D28-8.100.

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Moritani, Hiroshi, to Sharp Kabushiki Kaisha. Air conditioner. 304,364, 10-31-89, Cl. D23-353.000.

Moritani, Hiroshi, to Sharp Kabushiki Kaisha. Air conditioner. 304,365, 10-31-89, Cl. D23-353.000.

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302.2	4,877,930
308	4,877,931
CLASS 201	
1	4,877,488
CLASS 202	
181	4,877,489
CLASS 203	
15	4,877,490
62	4,877,491
CLASS 204	
1 T	4,877,492
15	4,877,493
28	4,877,494
42	4,877,495
44.2	4,877,496
55.1	4,877,497
86	4,877,498
98	4,877,499
157.48	4,877,500
157.64	4,877,501
181.7	4,877,502
182.1	4,877,503
192.11	4,877,504
192.38	4,877,505
242	4,877,506
243 R	4,877,507
290 R	4,877,508
298	4,877,509
299 R	4,877,510
406	4,877,511
435	4,877,512
CLASS 206	
170	4,877,128
309	4,877,130
317	4,877,131
344	4,877,135
364	4,877,132
416	4,877,133
443	4,877,134
459	4,877,119
514	4,877,151
521	4,877,136
597	4,877,137
617	4,877,139
CLASS 208	
106	4,877,513
120	4,877,514
251 R	4,877,515
CLASS 209	
155	4,877,516
167	4,877,517
	4,877,518
601	4,877,138
CLASS 210	
86	4,877,519
94	4,877,520
171	4,877,521
172	Re.33,103
198.2	4,877,522
	4,877,523
242.1	4,877,524
289	4,877,525
448	4,877,526
489	4,877,527
500.29	4,877,528
500.37	4,877,529
511	4,877,530
620	4,877,531
629	4,877,532
640	4,877,533
691	4,877,534
701	4,877,535
712	4,877,536
747	4,877,537
CLASS 211	
163	4,877,140
CLASS 215	
1 C	4,877,141
	4,877,142
230	4,877,143
330	4,877,144
CLASS 219	
10.55 E	4,877,932
10.55 M	4,877,933
68	4,877,934
69.12	4,877,935
85.22	4,877,936
121.59	4,877,937
	4,877,938
121.76	4,877,939
124.34	4,877,940
130.21	4,877,941
225	4,877,942
381	4,877,990
538	4,877,943
548	4,877,944
CLASS 220	
83	4,877,145
85 VR	4,877,146
	4,877,147
90.2	4,877,148
267	4,877,149
269	4,877,129
304	4,877,150
374	4,877,152
469	4,877,153
CLASS 221	
48	4,877,154
CLASS 222	
108	4,877,155
386.5	4,877,156
387	4,877,157
400.8	4,877,158
484	4,877,159
494	4,877,160
591	4,877,161
CLASS 223	
78	4,877,162
93	4,877,163
CLASS 224	
42.44	4,877,164
42.45 R	4,877,165
223	4,877,166
269	4,877,167
321	4,877,168
331	4,877,169
CLASS 226	
196	4,877,170
CLASS 227	
10	4,877,171
67	4,877,172
CLASS 228	
1.1	4,877,173
5.1	4,877,174
102	4,877,175
173.5	4,877,176
CLASS 229	
92.3	4,877,177
114	4,877,178
CLASS 232	
7	4,877,179
35	4,877,180
CLASS 235	
379	4,877,945
380	4,877,946
381	4,877,947
449	4,877,948
462	4,877,949
487	4,877,950
CLASS 236	
12.17	4,877,181
44 C	4,877,182
49.3	4,877,183
CLASS 237	
12.3 C	4,877,184
CLASS 239	
75	4,877,186
89	4,877,187
135	4,877,188
242	4,877,185
749	4,877,189
CLASS 241	
5	4,877,190
92	4,877,191
275	4,877,192
CLASS 242	
7.21	4,877,193
35.6 R	4,877,194
55.2	4,877,195
66	4,877,196
68.7	4,877,197
74	4,877,198
201	4,877,199
205	4,877,200
CLASS 244	
3.21	4,877,201
31	4,877,205
122 A	4,877,202
136	4,877,203
CLASS 248	
49	4,877,206
97	4,877,207
146	4,877,208
205.3	4,877,209
231.2	Re.33,104
298	4,877,204
318	4,877,210
352	4,877,211
444.1	4,877,212
451	4,877,213
483	4,877,214
CLASS 249	
109	4,877,215
207	4,877,216
CLASS 250	
211 J	4,877,951
213 A	4,877,952
214 R	4,877,953
222.2	4,877,954
239	4,877,955
259	4,877,956
306	4,877,957
327.2	4,877,958
336.1	4,877,959
341	4,877,960
397	4,877,961
442.1	4,877,962
455.1	4,877,963
	4,877,964
458.1	4,877,965
	4,877,966
461.1	4,877,967
484.1	4,877,968
507.1	4,877,969
560	4,877,970
CLASS 251	
1.3	4,877,217
61.3	4,877,218
149.2	4,877,219
CLASS 252	
8.7	4,877,538
8.75	4,877,540
8.8	4,877,539
47.5	4,877,541
56 S	4,877,557
62	4,877,542
62.64	4,877,543
99	4,877,544
171	4,877,545
174.17	4,877,546
299.61	4,877,220
	4,877,547
299.63	4,877,548
	4,877,549
344	4,877,842
373	4,877,550
378 R	4,877,551
392	4,877,552
492	4,877,553
511	4,877,554
512	4,877,555
544	4,877,556
626	4,877,558
CLASS 261	
35	4,877,560
CLASS 264	
4.3	4,877,561
22	4,877,562
26	4,877,563
40.6	4,877,564
105	4,877,565
118	4,877,566
153	4,877,567
211.21	4,877,568
221	4,877,569
282	4,877,570
512	4,877,571
555	4,877,572
CLASS 266	
272	4,877,221
CLASS 267	
64.13	4,877,222
64.17	4,877,223
140	4,877,224
140.1	4,877,225
196	4,877,226
CLASS 269	
43	4,877,227
156	4,877,228
CLASS 271	
2	4,877,229
3	4,877,230
3.1	4,877,231
10	4,877,232
196	4,877,233
225	4,877,234
279	4,877,235
CLASS 272	
33 R	4,877,236
54	4,877,237
70	4,877,238
126	4,877,239
CLASS 273	
1 GA	4,877,240
1.5 R	4,877,241
2	4,877,242
26 R	4,877,243
89	4,877,244
110	4,877,245
144 R	4,877,246
148 R	4,877,247
153 S	4,877,248
169	4,877,249
176 FB	4,877,250
194 A	4,877,251
232	4,877,252
240	4,877,253
249	4,877,254
299	4,877,255
400	4,877,256
CLASS 277	
206 A	4,877,257
212 FB	4,877,258
CLASS 279	
123	4,877,259
CLASS 280	
47.26	4,877,261
304.1	4,877,260
668	4,877,262
707	4,877,263
731	4,877,264
756	4,877,265
762	4,877,266
848	4,877,267
851	4,877,268
CLASS 283	
40	4,877,269
CLASS 285	
18	4,877,270
39	4,877,271
111	4,877,272
CLASS 290	
40 C	4,877,273
CLASS 292	
113	4,877,274
148	4,877,275
218	4,877,276
347	4,877,277
350	4,877,278
CLASS 293	
121	4,877,279
CLASS 294	
99.2	4,877,280
CLASS 296	
39.1	4,877,281
65.1	4,877,282
100	4,877,283
153	4,877,284
216	4,877,285
CLASS 297	
195	4,877,286
229	4,877,288
250	4,877,289
270	4,877,290
321	4,877,291
417	4,877,287
440	4,877,292
CLASS 298	
17 R	4,877,293
CLASS 303	
9	4,877,294
109	4,877,295
115	4,877,296
CLASS 307	
11	4,877,971
43	4,877,972
87	4,878,208
147	4,877,973
269	4,877,974
443	4,877,975
450	4,877,976
455	4,877,977
473	4,877,978
520	4,877,979
542	4,877,980
555	4,877,981
571	4,877,982
CLASS 310	
12	4,877,983
66	4,877,984
86	4,877,985
153	4,877,986
209	4,877,987
306	4,877,988
323	4,877,989
CLASS 313	
22	4,877,991
318	4,877,992
414	4,877,993
503	4,877,994
507	4,877,995
592	4,877,996
634	4,877,997
CLASS 315	
15	4,877,998
248	4,877,999
CLASS 318	
362	4,878,000
446	4,878,001
568.2	4,878,002
587	4,878,003
599	4,878,004
621	4,878,005
770	4,878,006
CLASS 320	
14	4,878,007
CLASS 323	
271	4,878,008
275	4,878,009
300	4,878,010
319	4,878,011
CLASS 324	
60 CD	4,878,012
61 R	4,878,013
71.3	4,878,014
71.5	4,878,015
73 R	4,878,016
109	4,878,017
158 F	4,878,018
204	4,878,019
207	4,878,020
309	4,878,021
318	4,878,022
	4,878,023
319	4,878,024
503	4,878,025
547	4,878,026
CLASS 328	
15	4,878,027
55	4,878,028
CLASS 329	
341	4,878,029
CLASS 330	
149	4,878,030
254	4,878,031
263	4,878,032
277	4,878,033
298	4,878,034
CLASS 332	
101	4,878,035
CLASS 333	
195	4,878,036
254	4,878,037
CLASS 337	
107	4,878,038
CLASS 338	
26	4,878,039
158	4,878,040
CLASS 340	
439	4,878,042
479	4,878,041
521	4,878,043
550	4,878,044
556	4,878,045
705	4,878,046
784	4,878,047
825.010	4,878,048
825.060	4,878,050
825.440	4,878,051
825.690	4,878,052
853	4,878,053
975	4,878,054
CLASS 341	
23	4,878,055
26	4,878,056
34	4,878,057
101	4,878,058
CLASS 343	
753	4,878,059
778	4,878,060
786	4,878,061
872	4,878,062
CLASS 346	
1.1	4,878,063
75	4,878,064
76 PH	4,878,065
108	4,878,066
	4,878,067
	4,878,068
140 R	4,878,069
	4,878,070
153.1	4,878,071
154	4,878,072
CLASS 350	
3.68	4,877,297
96.14	4,877,298
	4,877,299

96.15 4,877,300
96.19 4,877,301
96.21 4,877,302
4,877,303
96.29 4,877,304
96.30 4,877,305
96.33 4,877,306
132 4,877,307
276 R 4,877,308
337 4,877,309
347 E 4,877,310
354 , 4,877,312
391 4,877,313
422 4,877,314
451 4,877,315
537 4,877,316
559 4,877,317
569 4,877,318
604 4,877,319

CLASS 351

44 4,877,320
214 4,877,321
221 4,877,322

CLASS 353

120 4,878,073

CLASS 354

76 4,878,074
173.1 4,878,075
286 4,878,076
400 4,878,077
402 4,878,078
4,878,079
403 4,878,080
414 4,878,081

CLASS 355

27 4,878,083
4,878,084
47 4,878,085
77 4,878,086
207 4,878,087
208 4,878,082
244 4,878,088
253 4,878,089
256 4,878,090
260 4,878,091
285 4,878,092
296 4,878,093

CLASS 356

23 4,877,323
251 4,877,324
350 4,877,311
373 4,877,325
394 4,877,326

CLASS 357

5 4,878,094
16 4,878,095
23.3 4,878,100
23.5 4,878,101
24 4,878,102
4,878,103
30 4,878,104
42 4,878,096
58 4,878,097
59 4,878,105
68 4,878,098
71 4,878,099
72 4,878,106
4,878,107
81 4,878,108

CLASS 358

42 4,878,109
75 4,878,110
4,878,111
98 4,878,112
4,878,113
106 4,878,114
111 4,878,115
160 4,878,116
183 4,878,117
213.12 4,878,120
213.22 4,878,121
233 4,878,122
299 4,878,127
315 4,878,128
342 4,878,129
400 4,878,130
401 4,878,123
443 4,878,124
4,878,125
451 4,878,126
471 4,878,119

CLASS 360

37.1 4,878,131
59 4,878,132
64 4,878,133
77.15 4,878,134
78.04 4,878,135
4,878,136
98.05 4,878,137
99.02 4,878,138
4,878,139
113 4,878,140
120 4,878,141

CLASS 361

80 4,878,142
94 4,878,143
96 4,878,144
118 4,878,145
119 4,878,146
154 4,878,147
220 4,878,148
230 4,878,149
311 4,878,150
329 4,878,151
386 4,878,152
394 4,878,153
395 4,878,154
401 4,878,155

CLASS 362

109 4,878,156
123 4,878,157
140 4,878,158
222 4,878,159
269 4,878,160
305 4,878,161
352 4,878,162

CLASS 363

8 4,878,163
49 4,878,164

CLASS 364

158 4,878,165
191 4,878,172
200 4,878,166
4,878,167
4,878,168
4,878,173
4,878,174
413.01 4,878,175
413.19 4,878,169
449 4,878,170
468 4,878,176
474.29 4,878,171
489 4,878,177
490 4,878,179
507 4,878,180
518 4,878,181
4,878,182
521 4,878,178
4,878,183
557 4,878,184
572 4,878,185
574 4,878,186
721 4,878,187
724.01 4,878,188
736.5 4,878,189
752 4,878,190
759 4,878,191
768 4,878,192
4,878,193
900 4,878,194
4,878,195
4,878,196
4,878,197

CLASS 365

183 4,878,202
185 4,878,199
189.02 4,878,200
203 4,878,201
222 4,878,198
226 4,878,203

CLASS 366

46 4,877,327
76 4,877,328

CLASS 367

53 4,878,204
61 4,878,205
83 4,878,206
137 4,878,210
155 4,878,207

CLASS 368

113 4,878,209

CLASS 369

44 4,878,211
100 4,878,212
126 4,878,213
256 4,878,214

CLASS 370

58.1 4,878,215
60 4,878,216
77 4,878,217
94 4,878,218
97 4,878,219

CLASS 371

5.5 4,878,049
40.1 4,878,220
43 4,878,221

CLASS 372

38 4,878,225
48 4,878,222
50 4,878,223
53 4,878,224
107 4,878,227

CLASS 374

28 4,877,329
136 4,877,330
153 4,877,331
4,877,332
166 4,878,226
169 4,877,333

CLASS 375

3 4,878,228
14 4,878,229
27 4,878,230
80 4,878,231
111 4,878,232
116 4,878,233

CLASS 376

216 4,877,574
4,877,575

CLASS 378

40 4,878,234
136 4,878,235

CLASS 379

37 4,878,236
58 4,878,237
62 4,878,238
67 4,878,239
4,878,240
4,878,241
204 4,878,242
211 4,878,243
402 4,878,244

CLASS 380

10 4,878,245
44 4,878,246

CLASS 382

1 4,878,247
9 4,878,248
13 4,878,249
56 4,878,250

CLASS 383

3 4,877,334
6 4,877,335
8 4,877,336
21 4,877,337

CLASS 384

26 4,877,338
218 4,877,339
571 4,877,340

CLASS 400

119 4,877,341
121 4,877,342
4,877,343
124 4,877,344
342 4,877,345
479 4,877,347
624 4,877,346

CLASS 404

93 4,877,348

CLASS 405

27 4,877,349
38 4,877,350
86 4,877,351
104 4,877,352
128 4,877,353
157 4,877,354
159 4,877,355
169 4,877,356
267 4,877,357
4,877,358

CLASS 409

218 4,877,359
234 4,877,360

CLASS 410

112 4,877,361

CLASS 411

34 4,877,362
43 4,877,363
337 4,877,364

CLASS 414

459 4,877,365
517 4,877,366
796 4,877,367

CLASS 415

143 4,877,368
148 4,877,369
4,877,370
169.1 4,877,371
199.1 4,877,372
208.4 4,877,373

CLASS 416

134 A 4,877,375
136 4,877,374
207 4,877,376

CLASS 417

89 4,877,377
299 4,877,378
310 4,877,380

CLASS 418

51 4,877,379
55 4,877,381
4,877,382
61.3 4,877,383
184 4,877,384
197 4,877,385

CLASS 420

426 4,877,576
473 4,877,577

CLASS 422

14 4,877,578
56 4,877,579
58 4,877,580
68 4,877,582
73 4,877,583
88 4,877,584
100 4,877,585
101 4,877,586
135 4,877,587
186.19 4,877,588
186.24 4,877,589

CLASS 423

235 4,877,590
4,877,591
245.1 4,877,592
306 4,877,593
321 S 4,877,594
335 4,877,595
348 4,877,596
556 4,877,597
640 4,877,598

CLASS 424

1.1 4,877,599
4 4,877,600
10 4,877,601
49 4,877,602
57 4,877,603
64 4,877,604
65 4,877,605
78 4,877,606
84 4,877,607
85.8 4,877,608
88 4,877,610
4,877,611
92 4,877,612
4,877,613
101 4,877,614
115 4,877,615
123 4,877,616
409 4,877,617
448 4,877,618
450 4,877,619
451 4,877,620
498 4,877,621

CLASS 425

110 4,877,386
116 4,877,387
150 4,877,388
190 4,877,389
203 4,877,390
289 4,877,391
371 4,877,392
383 4,877,393
567 4,877,394

CLASS 426

46 4,877,622
87 4,877,609
231 4,877,623
241 4,877,624
250 4,877,625
4,877,626
285 4,877,627
302 4,877,628
4,877,629
4,877,630
422 4,877,631
502 4,877,632
506 4,877,633
531 4,877,634
542 4,877,635
607 4,877,636
634 4,877,637

CLASS 427

8 4,877,638
13 4,877,639
34 4,877,640
38 4,877,641
4,877,642
53.1 4,877,644
57 4,877,643
117 4,877,645
121 4,877,646
123 4,877,647
140 4,877,648
215 4,877,649
248.1 4,877,650
255 4,877,651
264 4,877,652
385.5 4,877,653
387 4,877,654
430.1 4,877,655

CLASS 428

15 4,877,656
31 4,877,657
34 4,877,658
34.1 4,877,659
34.6 4,877,705
34.9 4,877,660
4,877,661
35.5 4,877,663
35.9 4,877,664
36.1 4,877,665
36.7 4,877,662
64 4,877,666
4,877,667
68 4,877,668
88 4,877,669
116 4,877,670
139 4,877,671
156 4,877,672
172 4,877,673
192 4,877,674
204 4,877,675
4,877,676
216 4,877,677
4,877,678
224 4,877,679
332 4,877,680
336 4,877,681
412 4,877,682
421 4,877,683
475.8 4,877,684
500 4,877,685
514 4,877,686
520 4,877,687
522 4,877,688
607 4,877,689
627 4,877,690
645 4,877,696
673 4,877,692
688 4,877,691

CLASS 429

19 4,877,693
27 4,877,694
102 4,877,695

CLASS 430

20 4,877,697
45 4,877,698
54 4,877,699
58 4,877,700
59 4,877,701
72 4,877,702
76 4,877,703
99 4,877,704
106.6 4,877,706
4,877,707
126 4,877,708
128 4,877,709
138 4,877,710
176 4,877,711
256 4,877,712
270 4,877,713
4,877,714
271 4,877,715
309 4,877,716
321 4,877,717
326 4,877,718
4,877,719
512 4,877,720
522 4,877,721
559 4,877,722
598 4,877,723
621 4,877,724

CLASS 431

28 4,877,395
158 4,877,396

CLASS 432

106 4,877,397

CLASS 433

8 4,877,398
25 4,877,399
183 4,877,400
215 4,877,401
218 4,877,402

CLASS 434

24 4,877,403
118 4,877,404
160 4,877,405
278 4,877,406
302 4,877,407
350 4,877,408

CLASS 435

5 4,877,725
7 4,877,726
24 4,877,727
68 4,877,728
4,877,729
132 4,877,730
138 4,877,735
142 4,877,731
155 4,877,732
183 4,877,736
190 4,877,733
228 4,877,734
235 4,877,737
252.1 4,877,739
252.5 4,877,738
253.3 4,877,740

CLASS 436

8 4,877,741
65 4,877,742
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DESIGN PATENTS

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PLANT PATENTS

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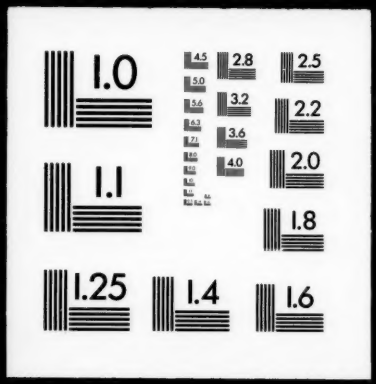
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